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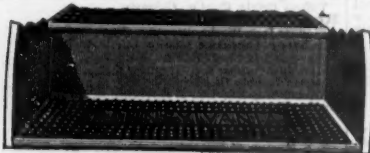
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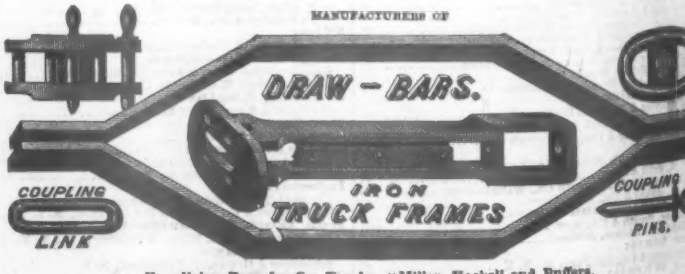
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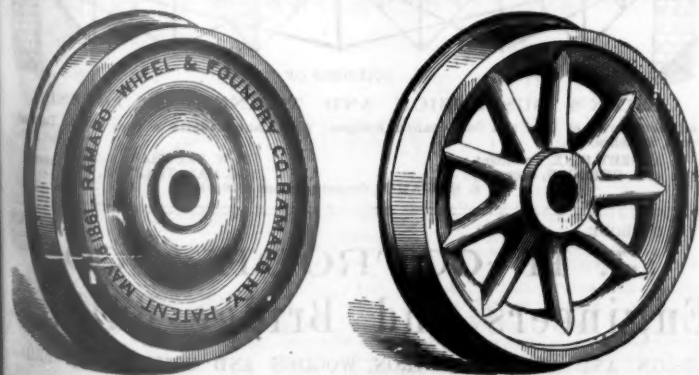
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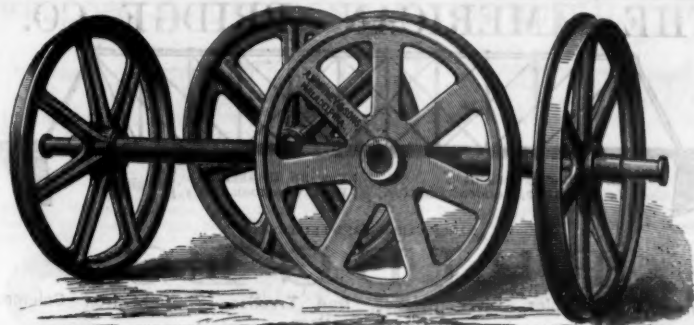
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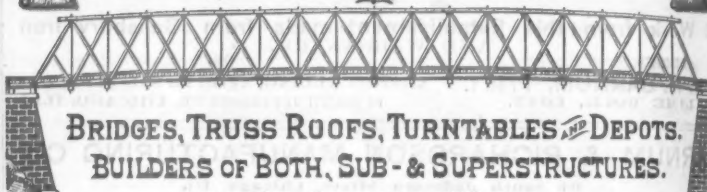


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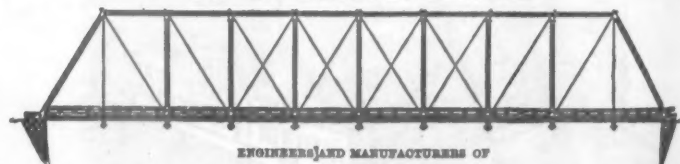
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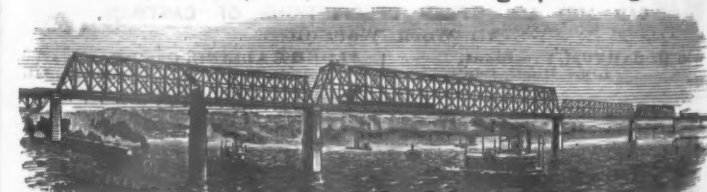
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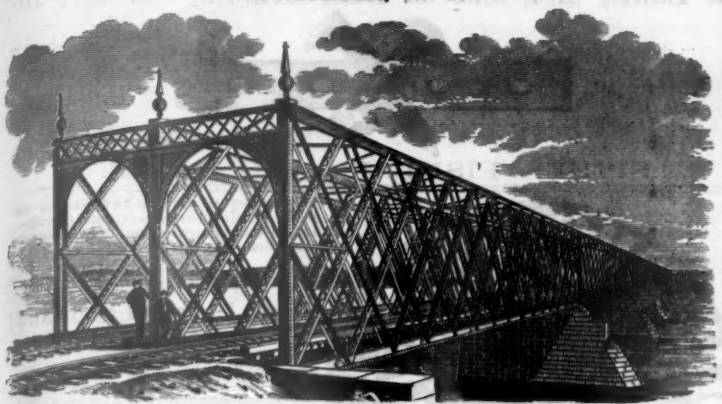
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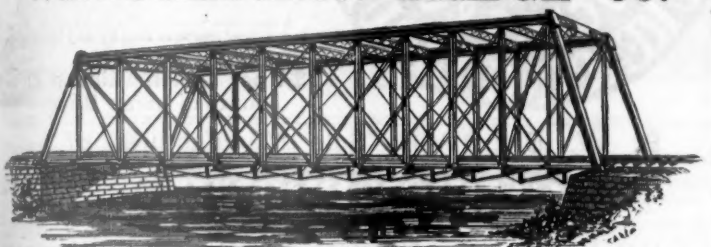
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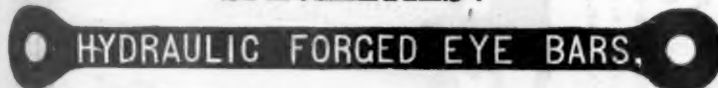
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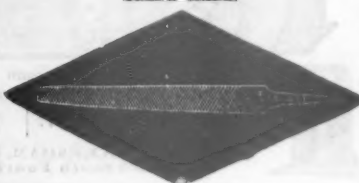
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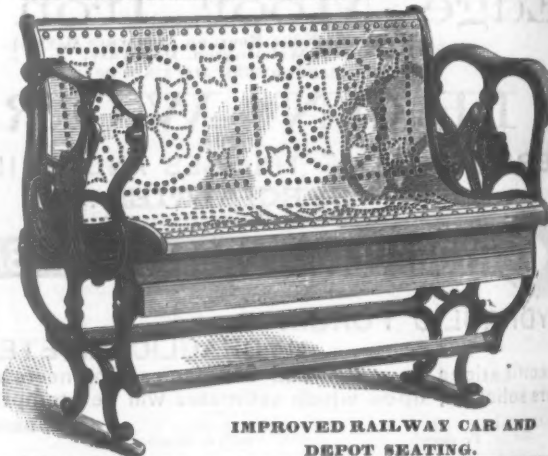
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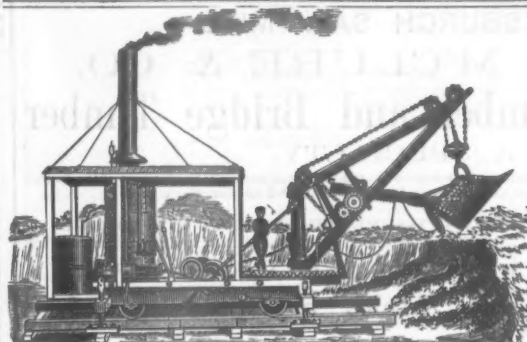
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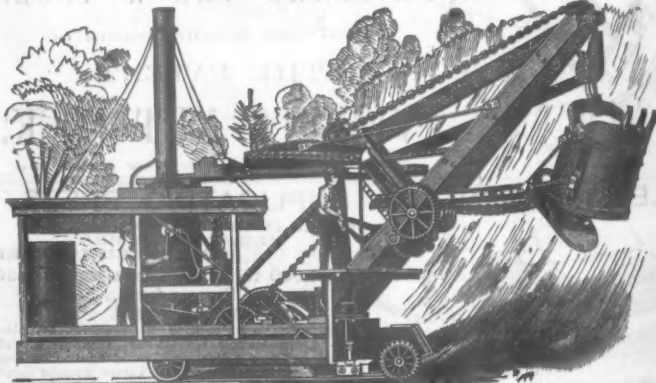
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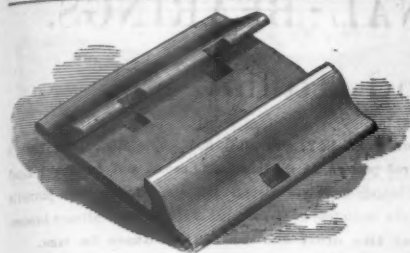
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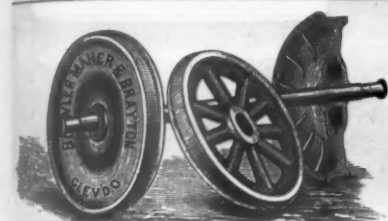


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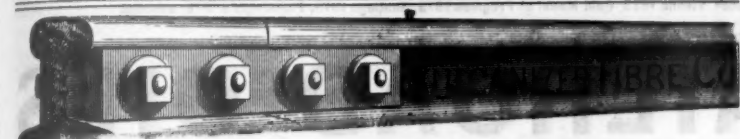
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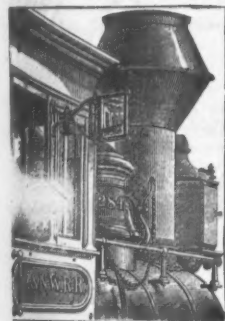
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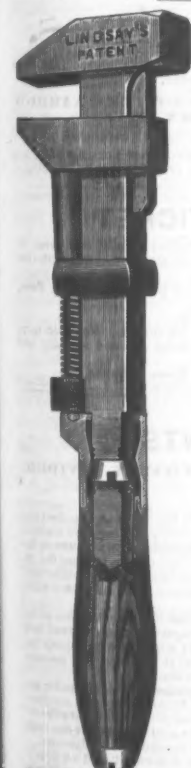
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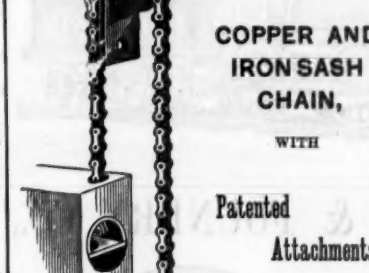
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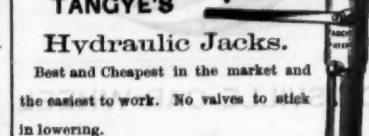
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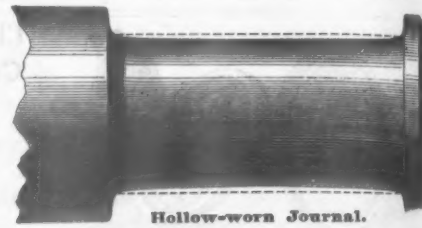
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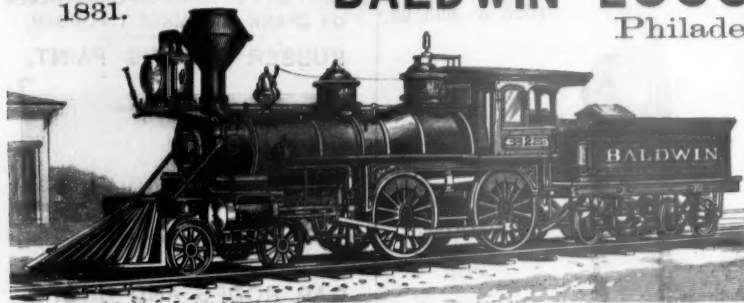


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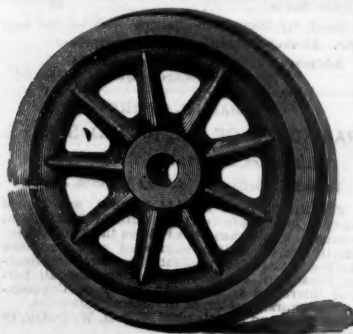
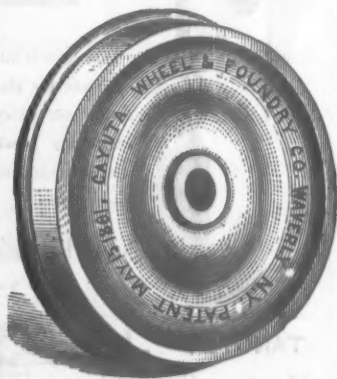
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FRIDAY, MAY 11, 1877.

Contributions.

Locomotive Pistons.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Two things at least may be said about locomotive pistons, one is that upon hardly any other detail of the machine has more ingenuity (of a certain kind) been expended, and the other that in but very few instances can ever a trace of this painstaking ingenuity be discovered as doing actual service.

The reasons for this apparent ignoring of so much patient labor are far from being obscure, although inventors and designers find them hard to understand, and still harder to appreciate in respect to their own contrivances. One of these reasons, a fact underlying all principles of construction, is that ingenuity does not necessarily involve the multiplication of parts, or the complex relation to each other of a few parts, but on the contrary that it is required, and is sometimes most severely tasked in reducing the number of parts, or in perfecting the simplicity of their arrangement with reference to each other. It might almost be said, indeed, that it would be easy to make anything in 50 pieces, but to make it in 25, or 10, or finally in 5, would be the work of only a true genius. To make the same thing in one piece, and to do it thus to a real advantage, would be indeed a crowning feat worthy of the highest commendation.

The writer has no new form of locomotive piston to propose or to recommend, but desires simply to urge the wider use of the more severely simple arrangements of parts. These cannot be said to involve anything whatever of recent design, though they may and do offer opportunity for the use of the newer forms or kinds of material which the last four or five years have brought into notice.

No one can deny the desirableness, on general principles, of simplicity of construction in a piston, or, indeed, the fact that it is, in idea, simplicity itself—that is, a mere block running closely in a cylinder. If, however, the circumstances attending its use, thus running in the cylinder, be considered, the requirements that may and do compel the abandonment of the simple solid block become quite obvious. It is true, however, that the contrivances of the cunningly devised pistons have failed, almost to a man, to appreciate some of the more important of these requirements, and so their endeavors have yielded little or no useful result.

One of the things that must thus be guarded against is the danger of injury to the steam-tight surfaces from the influx of cinders through the exhaust nozzle, or from the chance of muddy water boiling over with the steam, and from any such causes it is clear that the complex piston, of whatever form, will be probably the worst sufferer.

Then, too, the occasional examination of the piston in all its parts must be so provided for that it can be accomplished with the utmost readiness, the most complete certainty that no detail shall be passed by, and also (in some cases at least) so that in unskillful hands the parts when taken out shall not lie before the mechanic a hopeless puzzle. It is quite clear that some of these troubles, in fact very nearly all of them, will disappear if the simple solid block, without follower or springs, could be used, and hence it is equally clear that the more nearly the piston becomes a mere circular block the better.

It can hardly be claimed that much ingenuity is needed to put two or three rings each $\frac{1}{4}$ inch square into a solid block or piston-head, but it is nevertheless true that scores of persons can be found who quite refuse to believe that so old an idea as this, and one so simple, will really run for years in any cylinder, and continue perfect for the whole time.

It should be observed, however, that for the locomotive piston there may be needed a more ready means of complete examination than the removal of the entire piston and rod from the cylinder and the cross-head, though it may be said the simplest man could hardly fail to put it back again correctly, however ill the packing spring puzzle might fare at his hands. It is probable, therefore, that some men would require an adaptation of the movable follower arrangement before they would consent to use this perfect plan of a light ring without any means for expanding it against the walls of the cylinder except that due to its own outline.

There are ample reasons why the endeavor should be made to introduce new materials into such parts of the locomotive and even more into some parts of our cars, but one reason may be named which sometimes has rendered this difficult of accomplishment, viz., that manufacturers of new materials themselves do not always see clearly or promptly the precise requirements of any given case, nor do they always make the effort really needed when they do see the point. Some of these materials as found actually in use have been quite fully perfected and proportioned to the stress laid upon them, and thus the fact of accomplished success in many cases renders the way clearer to those who in like manner may be trying to promote needed improvements.

B.

The Heating Power of Boiler Tubes.

PATERSON, N. J., May 2, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send you copy of an article on the evaporating qualities of boilers on the multitubular system, which appeared some years ago in the *American Railway Times*.

Please notice particularly what Mr. Williams says about the information obtained from Mr. Durance, as to the relative

evaporative efficiency of the different sections of the boiler from 1 to 6, and at the same time bear in mind that Mr. Durance was in charge of the locomotives on the Liverpool & Manchester Railway, and see if you can find anything to support your idea that the experiments were tried on boilers without blast, as used on locomotives. You must not think that my notions about the value of the different compartments as heating surfaces are erroneous before you clearly understand what they are.

While I have no doubt as to the correctness of the experiments of Mr. Durance as showing the relative evaporative efficiency of the length of flues in the different compartments, cut off from each other by partitions, which prevents the water from flowing from one compartment to another, still his experiments do not show that the relative value of the tube heating surface in each section would be the same were the partitions removed; and it appears very clear to me that the same heating surface without the divisions would evaporate more water under similar conditions of temperature of feed water, intensity of fire, power of draft and pressure of steam, for the water would flow from the part receiving the least heat to where the heat was greater, and the circulation being promoted, the heat communicated to the water would be greater. You will not question the fact that the degree of heat passing through the tubes would be greatest at the furnace and least at the smoke-box end, and so also of the water, the temperature at the smoke-box end would be less than at the other end, and therefore more heat would be communicated at that end than would be the case if the water was as hot as at the furnace end.

WM. S. HUDSON.

[The following is the letter from Mr. C. Wye Williams, referred to by Mr. Hudson, which was first published in the *London Engineer* in 1868, and copied in this country by the *American Railway Times*, then published in Boston:]

EXPERIMENTS ON THE EVAPORATING QUALITIES OF BOILERS—THE MULTITUBULAR SYSTEM.

In my last letter I proposed to supply some facts in aid of the inquiry as to the value of the tubular system in the generation of steam, leaving to a future opportunity an examination of the cause of the comparatively insignificant effect of the heated products of combustion in passing through tubes. These facts may be tested by all, and with little trouble and expense, save that of time and patience, and will be found to prove, beyond question, that the tube system has been much overrated, and has not received that consideration which it imperatively demands.

We have seen that its introduction in marine boilers was the result of its apparent, and then unquestioned, effect in the locomotive, and that its adoption became universal, although without any inquiry as to its real merits or practical value. A few words as to its birth and parentage will enable us to see our way through this engineering anomaly. Mr. Smiles, in his "Life of George Stephenson," has supplied some important statistics on this point.

"The application," he observes, "of the same principle (the tubular), it has been stated, was first effected by M. Seguin, the engineer of the Lyons & St. Etienne Railway. He claimed to have patented a boiler in 1828, in which he placed a series of horizontal tubes immersed in water, through which the hot air passed in streamlets, thus greatly increasing the heating surface, and consequently the evaporative power. Two engines had been constructed at Mr. Stephenson's works for the St. Etienne Railway, which were sent to France in 1829. M. Seguin found that by applying his invention to those engines, in conjunction with the steam blast, he was at once enabled to increase their power and speed. The same idea of a tubular boiler had occurred to Mr. Henry Booth, who strongly urged its adoption by Mr. Stephenson, in the construction of the Rocket engine."

Here, in its very birth, we find the tubular system and the steam blast so "in conjunction" that their separate identities, as regards effects, could not be recognized, and that it was therefore impossible to discover to which was attributable the successful results obtained or how much was due to each respectively. The following extracts from a communication to Mr. Smiles, by Mr. Robert Stephenson, the eminent engineer, throws more light on the nature of this conjunction:

"After the opening of the Stockton & Darlington, and before that of the Liverpool & Manchester Railway, my father devoted his attention to various methods of increasing the evaporative power of the boiler of the locomotive engine. Among other attempts he introduced tubes containing water, by which the heating surface was materially increased. Two engines with such tubes were constructed for the St. Etienne Railway in France, which was in progress of construction in 1828; but the experiment was not successful—the tubes became furled with deposit, and burned out."

There is here some confusion; the tubes spoken of contained water, whereas in M. Seguin's plan they are described as "being immersed in the water." Here, however, and all through, we find the grave error or oversight of considering tubular surface, heating surface and evaporative power as convertible terms and equivalents in value. This error unfortunately continues to prevail to a great extent, vitiating the whole system and construction of boilers, and marring all calculation as to their steam-generative powers.

That this assumed and unquestioned identity prevailed in the mind of George Stephenson, is manifest from the fact that he continued to increase this tubular surface, and pushed it to the utmost practical limits, having actually constructed many engines with tubes no less than thirteen feet in length, or more than double that of the entire Rocket engine. Now if mere tube surface had been equivalent to evaporative power, he was unquestionably right, since the longer and smaller the tubes, the greater would be the aggregate of surface that could be compressed in any given space.

"Other engines," Mr. R. Stephenson adds, "with a variety of construction, were made, all having in view the increase of the heating surface, as it became obvious to my father that the speed of the engine could not be increased without increasing the evaporative power of the boiler."

This latter inference was no doubt a correct one: the error lay in assuming that the increase of evaporative power would necessarily be secured by an increase of the so-called (but improperly called) heating surface. Had Mr. Stephenson the facts before him which the recent experiments at Newcastle have brought to light, namely, that an addition of no less than 320 square feet of tubular surface (treble the entire tube surface of the "Rocket"), placed under the best possible circumstances for absorbing heat, could only extract 45° out of 600°, he would have looked out for some other mode of effecting his object, and have resorted to his first idea of having the water within instead of without the tubes, and by giving them a vertical position, or by other means, have avoided the evil which seems to have turned him aside from the true means of increasing evaporative effect.

That he was deceived as to the amount of evaporative effect produced by the tubes in the "Rocket" is manifest, seeing that

the entire tube surface of that boiler had but the insignificant aggregate of 117½ feet from twenty-five tubes—but little more than one-third of the proved ineffective 320 square feet of the Newcastle "heater."

The truth was, that the right application of the waste steam jet, which then for the first time had been effected, was so successful that it naturally created the impression that they had arrived at the true measure and proportions of heat-generating and heat-absorbing power; and that this result was attributable to the combination and "conjunction" of the steam jet and the tubular system, and that the one was as essential as the other, and of equal importance in the general result. "In the 'Rocket' engine," says Mr. R. Stephenson, "the power of generating steam was prodigiously increased by the addition of the multitubular system" (an inference drawn, unquestionably, without adequate proof).

"Its efficacy was further increased by narrowing the orifice by which the waste steam escaped to the chimney, for by these means the velocity of the air in the chimney, or, in other words, the draught of the fire, was increased to an extent that far surpassed the expectations even of those who had been the authors of the combination."

There can be no doubt of this fact; but why bring in "the combination" to divide the merit which was due, if not solely, to the manner in which the steam jet was applied and its powerful effect in causing increased consumption of the fuel? Why divide the honor and result with those assumed wonder-working 25 tubes and their 117½ square feet of surface?

The peculiar action of the steam jet and its source of power, has, like that of the tube system, still to be examined and explained. This, in either case, has hitherto not been done.

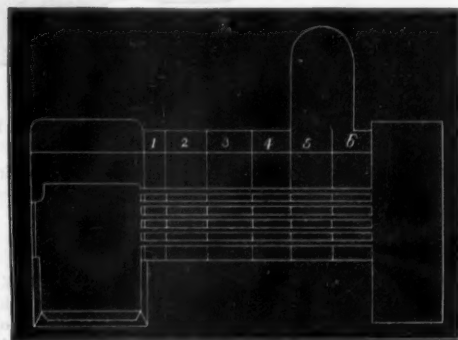
The expectations of all were, in truth, so far surpassed by the result of the performance of the "Rocket"—a result which at once redeemed the credit of Geo. Stephenson as a trustworthy engineer, and established the future of railway power—that there was no time or disposition to inquire or doubt, and the "conjunction" was thenceforward taken as the index and type of railway efficiency. Looking calmly from this distance of time, we may now ask, is it possible to attribute the extraordinary velocity obtained to the scanty aid of the 25 short tubes? That velocity "being so great during the trial trip that a speed of 29 miles an hour was obtained, about three times the speed that one of the judges had declared to be the limit of possibility." Mr. R. Stephenson, with a praiseworthy desire of giving due merit to others as well as to his father, adds: "It was not until he was engaged in making experiments, during the progress of the Liverpool & Manchester Railway, in conjunction with Mr. Henry Booth, that any decided movement in this direction was effected, and that the present multitubular boiler assumed a practicable shape. It was in conjunction with Mr. Booth that my father constructed the 'Rocket' engine." Here then we have recorded the date and locality of this twin birth—the "conjunction" of the multitubular system and the waste steam jet, which Mr. Smiles thus correctly describes. "The superiority of the arrangement in the 'Rocket' consisted in the rapidity of combustion in the fire-box keeping pace with the rapidity of motion in the locomotive itself; for according as the strokes of the piston in the cylinder were fast or slow, so were also the jets of steam thrown into the chimney, on which depended the draught of heated air (products) through the tubes of the boiler and consequently (a manifest non sequitur) the amount of steam generated from the water exposed to the large extent of heating surface (just 117½ square feet) which they represented."

Being on the spot, and taking a lively interest in all that concerned railway success, and as the most effective aid to steam navigation, I well remember and participated in the excitement of the moment and gave full credit to the authors of that "conjunction," the effect of which seemed unquestionable.

It was not until some years after, when the tubular system was introduced into our marine boilers, that any doubts were raised as to its absolute merit, as will hereafter be shown.

That the confounding the tube surface with evaporative effect is a great practical error, tending to the over-rating the tubular system, will be seen in the proofs which I here propose submitting.

Aware that experiments had been made on the Liverpool & Manchester Railway, I applied to Mr. Durance, who had been the engineer to the railway, for information on the subject, and with his permission here insert his reply. In the annexed diagram I do not represent the particular boiler in which the experiments were made, but merely show how the separate evaporative power of each portion of the tube surface was ascertained.



"LONDON, Feb. 1, 1858.

"DEAR SIR: In reply to your inquiries as to the experiments made by myself and Mr. Woods about the year 1842, as to the evaporative effect of the tube portion of a locomotive boiler, I have to say that we had one of the boilers employed on the Liverpool & Manchester line divided, so as to separate the water in the tubular portion of the boiler from that in connection with the fire-box portion."

"In a subsequent experiment I divided a small boiler into six different compartments, so that I could ascertain the weight of water evaporated in each."

"The first compartment was but six inches long, the remaining five were each twelve inches, the tubes being five feet six inches long. The result was that each square foot of the heat-absorbing surface in the first compartment was about equal to a square foot of the fire-box surface. In the second compartment each square foot of tubular surface was estimated at about one-third of that value; but in the remaining four compartments the evaporation was so small as to raise a doubt on my mind whether it had any value at all. In fact, I came to the conclusion that the first six inches of the tubular series had more evaporative effect than the remaining sixty inches."

(Signed,) "JOHN DURANCE."

The inferior or rather negative value of the tubular mass, with the exception of the first portion, of but six inches long, are here apparent, and at once dispels the illusion of supposing that mere tubular surface has the heat-absorbing power which is attributed to it.

I will, in my next, give the result of my own experiments, and which strikingly corroborate the above.

C. WYE WILLIAMS.

LIVERPOOL, March 13, 1858.

Soft Cast Steel for Car Wheels.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The recent discussions in your columns upon cast-iron wheels, their durability and cost, and the true basis upon which they should be compared with other wheels, are interesting and useful.

An important consideration which should enter into the estimates to be made in the future is the rapid advances which are making abroad in the art of casting soft steel direct to pattern. This is leading the way to an early use of this exceedingly desirable material for the wheel body or disc, and so to a direct and effective reduction of weight and of cost of transportation. No doubt this saving of weight will be but trifling in its real effect upon the cost of moving the car, but it may fairly be insisted upon as an item that ought to be considered in any such estimates as those referred to.

It can hardly be denied that soft steel is by all odds the best material now known for such a purpose, and if employed in connection with a harder rolled steel tire, a compound wheel may be produced that will leave exceedingly little to be desired.

Obviously, however, the consideration of cost must be taken into the account, though that does not affect the merits of the case from the metallurgist's point of view. It may be sufficient to remark here that the important reductions in cost which are of almost daily occurrence in the manufacture of steel promise at no distant day to reduce the present difference in favor of cast iron to almost or quite nothing.

It is perhaps hardly within your province to go at length into the exact merits of the case, but those who make wheels, and especially those who haul them up hill and down, may rest

permission was given for a trial of the car for three days on the West End Railway, of West Philadelphia. The trial was accordingly made, and the car worked satisfactorily. As three days were too short a time for an exhaustive trial, the proprietors of the Baldwin Locomotive Works next proposed to Mr. William Richardson, President of the Atlantic Avenue Railway, of Brooklyn (where permission to try steam had already been given), for an experiment with the car on his line. The arrangement was perfected and the car sent to Brooklyn, Dec. 25, 1876. It ran in Brooklyn from that time until June, 1876. One engineer ran the car and kept it in working order. Its consumption of fuel was between 7 and 8 pounds of coal per mile run. It drew regularly, night and morning, an additional car, with passengers going into New York in the morning and returning at night. On several occasions, where speed was practicable, the car was run at the rate of 16 to 18 miles per hour.

In June, 1876, this car was withdrawn from the Atlantic Avenue Railway, of Brooklyn, and, by an arrangement with John S. Morton, Esq., President of the Market Street Railway, of Philadelphia, placed on that line. It worked with fair success and very acceptably to the public, on the Market street line, from June till nearly the close of the Centennial Exhibition. Thousands of Centennial visitors were thus afforded an opportunity to witness the working of a steam car, and carried away impressions derived therefrom, which are doing much to promote the introduction of this form of motive power.

This original steam car was built with cylinders under the body of the car, the connecting-rods taking hold of a crank-axle, to which the front wheels were attached. The rear wheels of the car were independent, and not coupled with the front wheels. The machinery of the car was attached to an iron bed-plate bolted directly to the wooden framework of the car body. The experiment with this car demonstrated, to the satisfaction of its builders, the entire practicability of the use of steam on street railways; but the defects developed by this experimental car were: first, that it was difficult, or impossible, to make a crank-axle which would not break—the same experience being reached, in this respect, which had already presented itself in locomotive construction. Crank-axes in locomotive practice were abandoned in America many years ago, and are also disappearing in foreign locomotives. Second,

line. It will thus be seen that every precaution in the interest of safety has been taken.

In conformity with an arrangement made with the President of the company, the reconstructed steam-car "Baldwin" was placed on the Market street line, March 21, 1877, on the occasion of the trial trips made by the different steam-cars on that day. The maximum grades on this line are about 4 1/4 per cent., and up these grades, and around the curves, in all weathers, and in all conditions of the track, the "Baldwin" has been run with entire facility, and without ever "stalling" or requiring assistance.

In order to determine the cost of the fuel, the coal consumed was weighed, as delivered to the car, for seven days. The aggregate quantity of fuel used was 4,950 lbs. for these seven days, during which the car made a mileage of 88 miles each day, or 616 miles in all. The average consumption of fuel was, therefore, 8.03 lbs. of coal per mile run.

Four weeks' service of the "Baldwin" on the Market street line terminated April 18, and up to that date the car had made 88 miles per day, and had run seven days in the week. It had never lost a trip, and, at the date we speak of, occupied the same position on the line as on the day it began service. It has required no repairs, except the ordinary care and attention from the engineers running it. The daily expense of running the car has been, therefore, as follows:

Total cost of fuel, per day, at 8 lbs. per mile, 88 miles run, @ \$4.00 per 2,240 lbs. for anthracite coal.....	\$1 28
Oil, waste and tallow, per day, estimated.....	0 25
Engineer, 16 hours per day, @ \$0.25 per hour.....	4 00
Total cost.....	\$5 53

If to the above figures an allowance of one dollar per day is added, to cover depreciation and provide for future repairs, it is believed that the aggregate, \$6.51, will represent fairly the cost of working a steam car in the service described.

It should be noted that in this comparison the steam car is placed on the same basis as a horse car. This is, of course, unfair to the former, as it has ample capacity to run at three or four times the speed of a horse car, and on suburban lines, therefore, the economy of steam would increase very rapidly. One Philadelphia company, which works a suburban line with



LOCOMOTIVE CAR FOR STREET RAILROADS—BY THE BALDWIN LOCOMOTIVE WORKS.

assured that the light cast-steel centre, the tire being fixed in any approved manner, may be made in every way worthy of their careful examination and use. P. BARNES.

Steam Motors for Street Railroads.

From advance sheets of a report made to the Franklin Institute by its Secretary (Mr. J. B. Knight), at a meeting held April 18, to be published in the June number of the *Journal* of the Institute, we make the following extracts. The Secretary's paper in intended to be the beginning of a series on the general subject, this one being confined to the part taken by the Baldwin Locomotive Works towards solving the question of the substitution of steam for horse power on street-car propulsion:

The advantages to be gained by the use of steam are: greater economy in the operation and greater convenience to the public. The greater economy is expected from the fact demonstrated in every other business requiring power, that the most economical artificial power is derived from a steam boiler. The economy on steam on street railways, it is believed by some, has already been demonstrated by actual experience. Sufficient data have now been acquired to give actual figures on which to base a calculation. The superior advantages derived by the public from steam on street railways, will be, in the steam cars being more manageable than horse cars; in their occupying less space in the crowded streets of a city; in their being able to make their trips in shorter time (and this without running at a greater speed than horse cars), owing to the fact that they can be stopped and started much more quickly; and from the fact that, when steam is used, the greater speed obtainable will bring suburban localities practically nearer business centres.

In 1876 the Baldwin Locomotive Works became so strongly convinced of the growing demand for a better motive power than horses on street railways, that they concluded to build, at their own cost and risk, an experimental steam street car. The car was finished in November, 1876. The City Councils of Philadelphia were applied to for permission to try the car in this city, and under an ordinance passed by Councils

it was found that great objection existed to attaching the machinery to the wooden car body, which was not sufficiently rigid for the purpose, and which suffered by being racked and strained by the working of the machinery.

For these reasons the builders removed this original steam car from the Market street line in the fall of 1876, and placed it in their works to be reconstructed, in accordance with the experience which nearly a year's service had suggested. In order to remedy the trouble arising from the breakage of crank-axes, the machinery was made "outside-connected," the same as in an ordinary locomotive; and in order to obviate the defect found in attaching the machinery to the wooden car body, they designed and constructed a strong iron framework, which should be entirely independent of the car body, and which should support the boiler and all the machinery.

The car as thus reconstructed was named the "Baldwin," and is shown by the illustrations—one indicating the general appearance of the car in working order, and the other, the iron framework carrying the boiler and machinery. This iron framework really constitutes a complete locomotive in itself, independent of the car body. It was finished and run by itself, without the car body being attached, on a trial at the works. This design permits the use of existing cars, as the framework can be adopted to any car body. The cross pieces shown in the cut support the body, which is held in position by three bolts on each side. Only the front of the car where it adjoins the boiler needs any changing. The wheels are cast-iron centres, fitted with steel tires, and are coupled by connecting-rods on outside crank-pins. They are placed the same distance apart as the wheels of an ordinary horse car. The throttle valve is placed close to the cylinders, which gives the advantage of stopping and starting with great promptness. A powerful hand brake is provided, by which, with one motion of a lever, the engineer can stop the car in a few seconds. In addition to the brake, the engine can be reversed and back pressure used in case of emergency to arrest the motion almost instantaneously. The car is equalized on rubber springs with cross equalizing beams, and rides smoothly, without any shaking or rough motion from the operation of its machinery. The boiler is of steel, double-riveted, and fully capable of carrying with safety a steam pressure of 300 pounds per square inch; only about 90 pounds pressure, however, is required to move it loaded over the heaviest grades on the Market street

eleven horse cars, has expressed the opinion that six steam cars would do the same service.

We have thus far described only the steam car, in which the boiler is combined with the car carrying the passengers. The Baldwin Locomotive Works early turned their attention to a separate motor, to which the ordinary cars could be attached, believing that in many cases economical and practical reasons would favor its use. The general principles involved in the separate motor are the same as in the steam car. Boiler and cylinders of equal capacity are used, and the machinery and wheels are all attached to an iron framework strongly braced. The entire weight of the boiler, machinery and water tanks, for a line with ordinary grades, is 12,000 lbs., which is no greater than the weight of a horse car, when crowded with passengers. This is carried within the wheel-base, or the space between the two axles—thus doing away with all overhanging weight, front or back, and hence with all rocking motion. The motor moves very steadily, and is, therefore, no more liable to damage the track than is an ordinary horse car; in fact it is believed that by the steadiness of its motion, it is less damaging to the rails than a horse car. If steam is used in this manner, it will be seen that no changes whatever are required in the cars. The separate motor takes the place of two horses, and occupies the same space ahead of the car.

One of these motors was constructed in the fall of 1876, for the Citizens' Railway Company of Baltimore, the President of which line, Mr. John S. Hagerty, was quick to recognize the value and economy of this means of transit. The Citizens' Railway has maximum grades of seven feet per hundred, or 389 1/2 feet per mile. The service required by Mr. Hagerty was that the motor should draw two loaded cars up this grade. The Baldwin Works constructed one machine, which was tried on the line, and was found fully capable of drawing one car, but with insufficient power for two. A second motor was accordingly built, which weighed about 16,000 lbs., and which was sent to the Citizens' Railway in December, 1876, arriving there in the midst of the exceptionally severe snow storm. During ten days' trial it fully demonstrated its capacity to do the work required. It ascended the 389 feet grade, drawing one loaded car, when the tracks were covered with mixed snow

*An illustration of this was published in the *Railroad Gazette* of Nov. 24, 1876 (page 509).

and dirt to a depth of 8 to 10 inches in places. Where four horses were required to draw an ordinary car, the motor ascended the grade, drawing a loaded car without difficulty. As a result of this trial, the President of the company wrote on Dec. 22 as follows: "I have not tried it with two cars, but it has had a test sufficient to guarantee us in taking it, so far as climbing the hills is concerned. It has gone up the grades with one hundred passengers on the worst day I have ever seen on our road." Subsequently the motor did its regular work and drew two cars without difficulty up the grade named. On several occasions during the heavy snows of December and January, the motor was used to haul the sweeper for clearing the tracks, thus taking the place of from ten to fourteen horses, which were usually employed for the purpose. The city authorities of Baltimore, however, have not as yet granted permission for the regular use of this machine on that line, and it is therefore laid aside for the present.

Another and smaller motor, weighing only 12,000 lbs., was constructed about the same time for the Urbano Railway of Havana, Cuba. On its completion it was tried for some days on the Market street line, Philadelphia, and drew one car regularly over the road, occasionally with as many as one hundred passengers. It worked with entire success, ascending the grades of 4 1/2 feet per hundred, and was then shipped to Cuba. The results of its trial on the Urbano Railway of Havana are given in the following extract from a report (translated from the *Commercial Bulletin* of Havana, of Nov. 9, 1876: "The machine which was to be tried, being attached to two cars, occupied by some forty persons, drew them with a velocity which was diminished or increased at the command of the conductor's bell, stopping several times instantaneously without the slightest shaking being noted in the cars. The experiment was made on different occasions during the trip from the station of the 'Carmelo' to the 'Torre de San Lagaro,' and

adjustment, have been attended to by the engineers. Two engineers per day are employed, giving them ample time to attend to this matter:

Cost of Running one Steam Car one Day.

Fuel, 88 miles, at 8 lbs. per mile, equal to 704 lbs., at \$4 per 2,240 lbs.	\$1 25
Oil, waste and tallow.....	0 25
Wages of engineers, 16 hours, at 25 cts. per hour.....	4 00
Repairs and maintenance of car and machinery.....	1 00
Daily interest on cost of steam car, \$3,000, at 6 per cent. per annum.....	0 49
Total.....	\$7 00

Saving—steam over horse car, at \$1.53 per day, equal to \$558.45 per car per annum.

These figures, however, present only a partial view of the saving which may be effected. There are two elements of cost which are not taken into account, viz.: the capacity of steam cars for greater speed, enabling a smaller number of cars to do the same service, and the saving in real estate and buildings requisite for stables, storage of feed, etc. In respect to the greater speed of steam cars, it should be remarked that this can be effected without increasing the rate of speed in the crowded streets of a city. Some saving of time can be effected even here, however, by the ability of the steam car to stop and start more quickly than a horse car; but a very great saving of time can be effected on the suburban parts of the line, by the possibility and desirability of a much higher speed than horse cars can attain. The following comparison is based on a road assumed to be worked by 50 cars and 450 horses. It will not be doubted but that the allowance of 40 steam cars to do the same service will be considered ample. It will also be admitted that one-fourth of the space will be sufficient to house the 40

Secretary; A. W. Briggs, Illinois Central Railroad, Assistant Secretary.

SYNOPSIS OF PROCEEDINGS.

The following subjects were presented:
 First.—Manner of Tracing Cars by Paper.
 Second.—Time of Closing Car Reports by Station Agents.
 Third.—The manner of Computing Mileage.
 Fourth.—Time of Rendering Mileage Reports to Foreign Roads, and by whom.
 Fifth.—Lists of Classification; Numbers, Initials and Marks on Cars.

RESOLUTIONS.

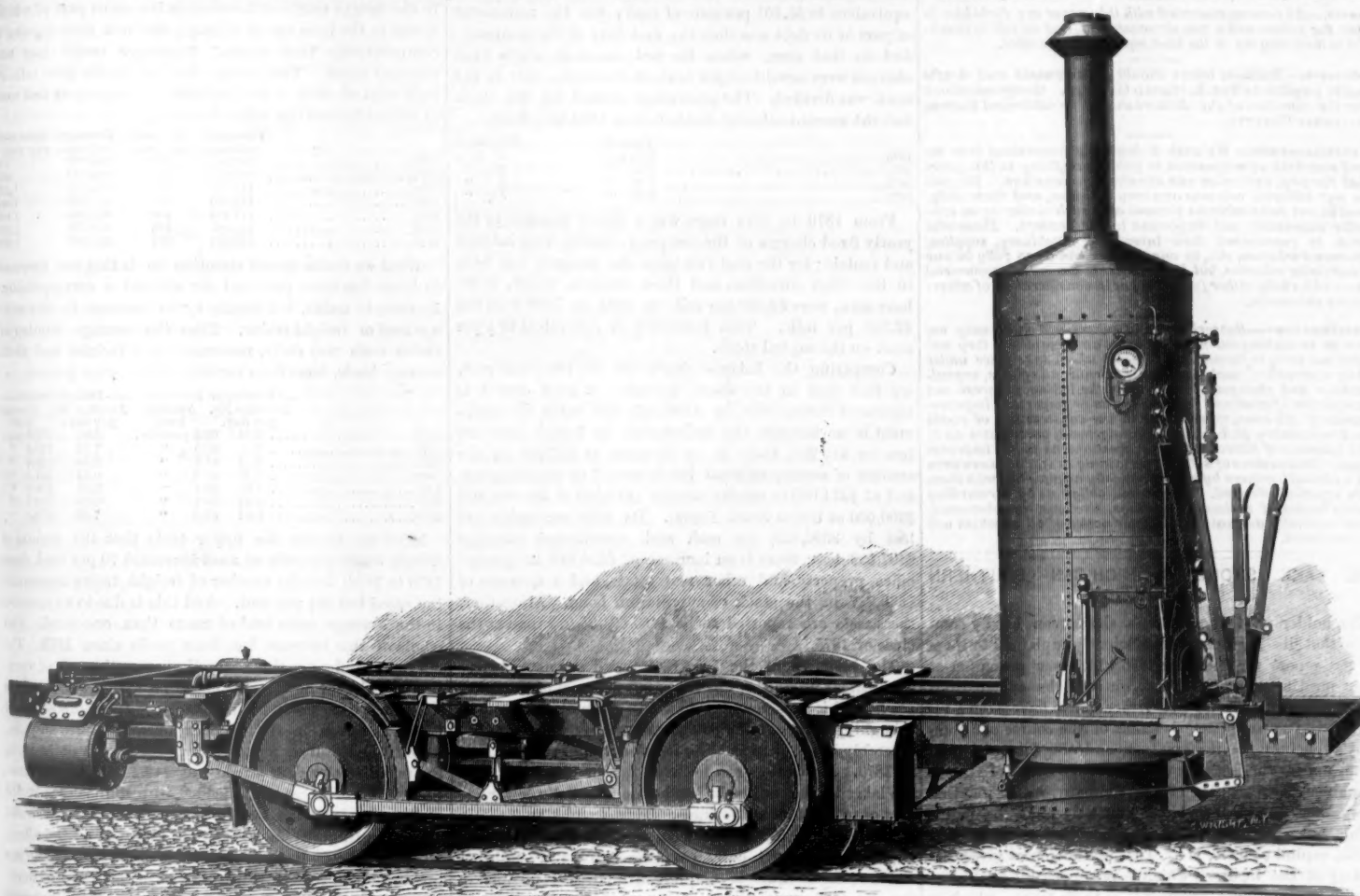
Resolved, That roads receiving tracers will immediately make their notations of disposition made of each car, and return the tracer direct to the sender, and then send sub-tracers to connections, if any of the cars have passed beyond their line. The sub-tracers all to be returned to the owner of the car.

Resolved, That a uniform time for closing junction station car reports is desirable, and it is the sense of this meeting that 12 o'clock (midnight) is the proper time.

Resolved, That computing mileage direct from conductors' reports, or from records made up from conductors' reports, is the only correct way of obtaining the honest mileage of cars; and all roads are requested to have mileage computed in that manner.

Resolved, That mileage due foreign roads should be made up and forwarded within fifteen days from the close of each month. It is the desire of the convention that roads having a person known as a Car Accountant should be allowed to render and receive mileage reports, and that the names of all such be inserted in the list of officers in charge of car service accounts in the *Official Railway Guide*.

Resolved, That in view of the fact that so many roads have



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each time, at the proper striking of the bell, the same result was obtained. At its usual velocity, in ascending a grade of 2 per cent, it can be stopped in three seconds, and going down the same, in seven." It may be added that the consumption of fuel by this motor was found to be about the same as in the steam street car, viz.: eight pounds of coal per mile run.

Both of the motors above described were supplied with powerful steam brakes, by which the brakes could be applied instantaneously by opening a valve, admitting steam to the brake cylinder.

In conclusion, the following carefully prepared figures are presented, showing the economy of steam as compared with horse-power, for street railway traffic. Apart from the superior facilities afforded the traveling public by steam, the saving which can be effected, is, of course, the practical question involved. In the following table, the calculations are made on the basis of statements and reports of various street railway companies in Philadelphia:

Cost of Running one Two-horse Car one Day.

For one car 9 horses are required; first cost (at \$140, \$1,260.	
Feed and stable expenses (feed, straw, hostlers, stable boys and medicines) of 9 horses, at 46 cts.....	\$4 14
Shedding of 9 horses, at 6 cts.....	0 54
Maintenance of harness of 9 horses, at 2 cts.....	0 18
Maintenance of 9 horses (value of \$1,260) at 3 3/4 per cent. per annum for depreciation, equivalent per day for 9 horses to.....	1 15
Maintenance of car.....	0 40
Wages of driver.....	1 75
Daily interest on cost of car (\$1,000) and 9 horses (\$1,260), \$2,260, at 6 per cent. per annum.....	0 37
Total.....	\$8 53

In comparison with the above, the following statement of the cost of running a steam car is submitted. The figures in this case are taken from actual experience with the Baldwin steam car and motors on the Market street line, in this city, as well as on other lines where these machines have been used. It is proper to state that the allowance for repairs and maintenance of the car and machinery is estimated. There has been no expenditure on the steam car on Market street in over five weeks' service, under this head. Such slight repairs as have been necessary, in the way of keeping the machinery in

steam cars which would be required to house and stable 50 horse cars and 450 horses:

Annual Expenses of a Road worked by 50 Cars and 450 Horses.

Annual operating expenses, as above.....	\$155,672 50
Interest on cost of real estate and buildings for car houses and stables (say \$150,000), at 6 per cent.....	9,000 00
Taxes, insurance on buildings and repairs of buildings.....	2,000 00
Total.....	\$166,672 50

The same work could be done by 40 steam cars, at the following cost:

Annual operating expenses of 40 steam cars, as above.....	\$102,200 00
As stables may be dispensed with, and fewer cars require shelter, one-fourth the land and buildings would suffice. Interest on \$37,000, cost of real estate and shed for steam cars, at 6 per cent.....	2,250 00
Taxes, insurance on buildings and repairs of buildings.....	750 00
Total.....	\$105,200 00
Annual saving, steam over horse cars.....	61,472 50

When these elements in the problem are taken into consideration, the saving which can be effected by a road worked as above becomes enormous. In the above example it amounts to over 37 1/2 per cent. of the annual expenses for operating, taxes, insurance and repairs. It is believed that a much smaller proportion of steam cars, as compared with horse cars, than is assumed in above calculation, would suffice. On this point actual experience is requisite. It is certain, however, that the greatest economy and the most thorough solution of the problem will be reached by any company which abandons the old and commits itself fully to the new method of transit.

The Car Accountants' Convention.

The following is the official report:
 The second annual meeting of the Car Accountants' Association convened in the Grand Hotel, Indianapolis, Ind., April 18, 1877.

Geo. W. Jones, of the Pennsylvania Railroad, was elected Chairman; F. M. Luce, Chicago and Northwestern Railway,

cars with various marks and initials, it is earnestly requested that all roads and fast freight lines have printed lists for exchange, showing the classification, numbers, initials and marks on cars. It is the belief of this meeting that it will be economy to have such lists issued, thereby insuring more correct reporting of mileage.

Resolved, That a vote of thanks be extended to Mr. A. J. Chapin, Car Accountant of the Boston & Albany Railroad, for his efforts in securing the adoption of a system in New England, whereby the mileage of foreign cars will hereafter be made up from conductors' reports. The Car Accountants' Association desire to state that they believe it to be one of the good results of their last meeting.

The following gentlemen were appointed as committee, to prepare subjects for discussion at the next meeting: H. F. Woodward, Northern Central Railway; George Stephens, Philadelphia, Wilmington & Baltimore Railroad, and E. Matthews, Chicago, Burlington & Quincy Railroad.

The following were appointed Committee of Arrangements: G. K. Cooke, Erie Railway; A. W. Davies, Atlantic & Great Western Railroad; F. M. Luce, Chicago & Northwestern Railway.

Convention adjourned at 4 o'clock, to meet at New York, April 26, 1878.

An invitation is extended to all railroads and fast freight lines, to send a representative to the next meeting.
 A. W. BRIGGS, Car Accountant,
 Illinois Central R. R.
 F. M. LUCE, Car Accountant,
 Chicago & Northwestern R'y,
 Committee on Publication.

Legislation Against Strikes.

A bill, very similar in its provisions to the laws lately enacted by New Jersey, Delaware and Pennsylvania, has passed the lower house of the Illinois Legislature. It provides penalties for abandonment of a locomotive on the road, for damaging equipment or obstructing the track, and for conspiring to obstruct or prevent the running of trains. There was very little opposition to its passage.



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Editorial Announcements.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particularly as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE LAKE SHORE & MICHIGAN SOUTHERN REPORT.

The holders of this company's shares can hardly complain that its business is insufficiently explained to them in the report for the year 1876 which was presented at their meeting on the 2d inst., or that the explanations lack clearness. We do not remember to have seen a report giving so complete an exhibit of the course of a company's business, of its earnings and the disposition of them, not for the last year only, but for a series of years—ever since the formation of the company, in fact; so that the reader can see at a glance not only what the road is doing, but what progress is made in earnings, expenses, traffic, capital charges, etc. That is, the report gives that history of the business which is indispensable to the formation of a rational judgment as to its future, which is what most stockholders want to know, especially if they have had to submit to a reduction in dividends, as has been the case with the Lake Shore stockholders since 1872.

At the time of the consolidation in 1870, it was thought that the Lake Shore could be counted upon as good for regular 8 per cent. dividends thereafter. It owned about a thousand miles of railroad, had probably a heavier traffic than any other line west of Buffalo and Pittsburgh, was so placed as to be sure to catch a great part of the through traffic from the country between it and the Ohio, was compelled every year to accommodate a large increase of business over that of the preceding year, and seemed more likely to be choked with traffic than to be burdened by capital charges for additions to its capacity in excess of the demand.

The capital of the company was increased after the consolidation, the amount of stock being made \$50,000,000 instead of \$36,000,000; a few new branches were leased, and very great improvements were made in the main line, which, indeed, would not have been able to do its work without most of them. Thus the yearly fixed charges for interest on bonds and rentals of leased lines increased more than one-half from 1870 to 1874—from \$1,828,897 to \$3,008,193. In 1873, when the former President, Mr. Horace F. Clark, died, the additional indebtedness had all been incurred, and thus there came a large increase in the yearly charges just at the time when the altered condition of the business of the country made it impossible to make the old rate of profit on traffic, and when the increase in the capital stock required a

much larger amount to pay the usual dividend. The company then was in a bad way. It had incurred a large floating debt for improvements, which in the condition of the market at that time it was impossible to fund by any ordinary means. It was then that the late Cornelius Vanderbilt, the successor of his son-in-law, Mr. Clark, as President of the company, saved it from bankruptcy by advancing from his own means the money needed to pay the company's debts—some six million dollars, if we remember right.

At the time of the consolidation, in 1870, it required only \$1,805 of net earnings per mile of road to pay the fixed charges, and \$2,717 more paid the 8 per cent. dividends; in 1874, \$2,560 per mile was required to pay the fixed charges, and 8 per cent. on the capital stock was equivalent to \$3,367 per mile.

Thus within four years the amount necessary to pay the interest, rentals and 8 per cent. dividends had grown from \$4,522 to \$5,927, and this additional \$1,400 of net earnings must be made when the business of the country was in the most unhealthy condition, and traffic, though still large, would not pay the old prices. The company had the advantage of a greatly improved road, which enabled it to do its business with greater economy, and it was in this year 1874 that it made its largest profits—equivalent to \$5,101 per mile of road; but the retirement of part of its debt was then the first duty of the company; and in that year, when the net earnings above fixed charges were equal to 6 per cent. on the stock, only 3½ per cent. was divided. The percentage earned for the stock and the amount actually divided since 1872 have been:

	Earned.	Dividend.
1872.....	5.09 p. c.	4 p. c.
1873.....	6.05 "	3½ "
1874.....	2.21 "	2½ "
1875.....	3.25 "	3½ "

From 1870 to 1874 there was a steady increase in the yearly fixed charges of the company, arising from interest and rentals; for the past two years the progress has been in the other direction, and these charges, which, as we have seen, were \$2,560 per mile in 1874, in 1876 were but \$2,345 per mile. This reduction is equivalent to ½ per cent. on the capital stock.

Comparing the balance sheets for the two years past, we find that in the assets the value of road owned is increased during 1876 by \$160,323; the value of equipment is unchanged; the investments in leased lines are less by \$12,246; there is an increase of \$47,950 in the amount of sundry railroad bonds owned by the company, and of \$214,000 in sundry stocks (\$14,500 of its own and \$200,000 of Union Stock Yards). Its bills receivable are less by \$304,829, its cash and uncollected earnings \$407,539 less; there is an increase of \$216,843 in general office property and other real estate, and a decrease of \$383,917 in the stock of supplies on hand. Altogether, the assets are reported to be \$465,894.35 less than at the close of 1875.

The business of the Lake Shore road was never before so great as in 1876, as was the case with most of the trunk roads. This was not due to the Centennial, as might be thought; for though the passenger traffic of 1876 was considerably larger than in 1875, it did not quite equal that of 1873. It was the great bulk of freight attracted from the lakes to the railroads by the exceptionally low rates that gave the unusual business. This freight traffic was equivalent to 1,320 tons of freight—132 fully loaded cars—carried each way daily over the entire 1,177 miles of road worked. This is not an effective way of putting it; on the contrary it gives the impression of a light traffic; but it is easily comprehended in this form; and to aid in forming a comparative estimate of it, we may say that on the 1,624 miles worked by the Pennsylvania Railroad the freight traffic last year was equivalent to but 1,884 tons each way daily, or 60 per cent. more than on the Lake Shore; on the New York Central, to 2,294 tons; on the Erie, to 1,491 tons; on the Chicago & Alton, to 440 tons; on the Illinois Central, to 327 tons. The Lake Shore has a greater mileage of branches than of main line, and it is the branches, usually, which bring down the average.

Compared with the previous year, the passenger traffic was 6.4 per cent. and the freight traffic 20.2 per cent. greater.

Yet the earnings of the road were the smallest since 1870, were 3½ per cent. less than in 1875, 18.3 per cent. less than in 1874, and 28 per cent., or \$5,465,000, less than in 1873. This is no longer an anomaly requiring explanation. The course of rates has been downward so rapidly and so long and so generally that we take it as a matter of course that earnings should be reduced, whether traffic has grown or not. On the Lake Shore, which in 1875 received but 1.01 cents per ton per mile for freight, the reduction in rates was 12 per cent. on passengers and 19 per cent. on freight. From 1873 to 1876 there was a reduction in the average rates received of 18 per cent. on passengers and 39 per cent. on freight.

Even after the panic of 1873 and the fall in prices which followed, it would not have seemed possible that any company could exist with such reductions in rates. If the expense per ton per mile had been as great on the Lake

Shore in 1876 as in 1873, there would have been a loss of \$1,217,000 on the freight business of that year, which actually yielded a profit of \$2,915,000; and if the passenger expense had been as great, the passenger profits would have been reduced \$650,000—that is, the total earnings of the year would have been \$400,000 less than the bare working expenses.

Instead of this we find that the net earnings of 1876 were \$4,374,000, against \$5,868,000 in 1873,—that the reduction in working expenses has almost kept pace with the reduction in rates.

Part of this reduction of expenses—and a large part—is due to the causes which have reduced the rates and nearly all other prices—to the lower cost of labor and supplies; another part, which must not be ignored, to the great improvements made in the road by steel rails, second tracks, etc., which have greatly reduced the expenses of maintenance—of machinery, as well as of road. But still another part is due to improved methods of working, which the necessities of the times have so effectually taught on so many lines since 1873. One of these is worth mentioning here, as it is very well exhibited by figures in this report, which cover the business of every year since the consolidation.

In that time (since 1870) there has been a large increase in the freight traffic of the road, only a small part of which is due to the increase of mileage, the new lines having a comparatively thin traffic. Passenger traffic has not changed much. The average bulk of traffic per mile of road worked—that is the number of passengers and tons of freight hauled one mile—has been:

	Passenger mileage.	No. each way daily.	Tonnage.	Tons each way daily.
1870.....	158,440	217	566,769	714
1871.....	152,862	192	688,110	996
1872.....	142,878	196	914,123	1,203
1873.....	152,650	209	892,280	1,222
1874.....	147,425	202	850,504	1,164
1875.....	140,384	192	802,752	1,100
1876.....	149,123	204	963,300	1,260

What we desire to call attention to is that the increase in traffic has been provided for without a corresponding increase in trains, but largely by an increase in the average load of freight trains. Thus the average number of trains each way daily, passenger and freight, and their average loads, have been for each of the seven years:

	Passenger trains—Average No. per day.	Average load.	Freight trains—Average No. per day.	Average load.
1870.....	3.14	69.2 persons.	5.92	133.3 tons.
1871.....	3.02	60.5 "	7.22	129.4 "
1872.....	3.16	61.5 "	8.58	129.7 "
1873.....	3.50	60.8 "	9.93	131.3 "
1874.....	2.94	68.7 "	7.56	154.0 "
1875.....	3.20	60.1 "	6.76	162.7 "
1876.....	3.04	67.2 "	7.36	179.3 "

Here we see by the upper table that the amount of freight traffic per mile of road increased 70 per cent. from 1870 to 1876; but the number of freight trains meanwhile increased but 26½ per cent. And this is due to an increase in the average train load of more than one-third. The whole of this increase has been made since 1873. The enormous influence this naturally has on the cost of working is evident, however it might be obtained; but there would not necessarily be any change in the composition of trains, not even in the number of cars hauled in them, were it the result of a more even distribution of traffic in the two directions. If a road had traffic only in one direction, trains of 20 cars fully loaded with 10 tons each would show an average train load of but 100 tons; but if a traffic should spring up to load these cars fully on the return trip, the average load would become 200 tons, and no improvements in road or rolling stock or methods of working would be needed to accommodate this increased average load. But there has been no such change on the Lake Shore road; 71.8 per cent. of the freight movement was eastward in 1870, and 72.9 per cent. in 1876, and during the seven years the proportion has varied only from 71.7 to 75.4 per cent. The increase in load has been a genuine one.

There has been a similar development on most of the important railroads of this country within the past few years, as we have often taken occasion to notice; but it is particularly noticeable in the case of this road because the report gives the figures for a series of years and also shows that there has been no favorable change in the proportion of freight carried in opposite directions.

This, apparently, aside from the reduced cost of labor and supplies, is the most effective of the causes which have reduced so largely of late years the average cost of carrying freight. It is itself, however, a secondary cause, resulting from complex primary causes, among which may be counted generally an improved condition of tracks, and sometimes (but not always) the introduction of more powerful engines.

The future of this company depends very largely on the condition of the through freight business of the country—on the amount of it, and still more on the rates received for it. It has been one of the greatest sufferers by the prolonged competitive contests of the past two years. The profit on freight has been reduced to so small an amount that a comparatively slight decrease in the rate makes a serious inroad on the profits. As this report states, if the 1.01 cents per ton per mile received in 1875, then the lowest rate ever known, had been obtained last

year, the result would have been an increase of \$2,188,300 in the net earnings. But then the converse of this is also true: a very slight increase in the average rate will make large addition to the profits. So far this year the rates have been higher, and there is every prospect that they will continue to be so. It is true that they cannot be made high, especially on some important freights, without diverting back to the lakes part of the traffic acquired last year. But this is hardly to be lamented. The railroads should not want the grain traffic on last year's terms; and they are sure of a considerable amount of this freight in the fall and winter at profitable rates, if they will insist on them. Meanwhile, fourth-class rates, including the enormous provision freights, are twice as high as last year at this time; live stock, the next in amount, is considerably higher; passenger rates will average nearly one-half more on through passengers; there is promise of a large freight traffic, to be divided between the water and rail routes, and though passenger traffic will probably be light it may easily be more profitable than last year. Meanwhile, there is nothing, apparently, to increase the cost of working, and nearly all additions to the rates are likely to become available net earnings. A return to the very low rates of 1874, only 1.18 cents per mile, though accompanied by a reduction in freight traffic to the figures of that year (12 per cent. less than last year) would give a profit of more than \$6,000,000 on freight alone—more than the company has ever yet made on its whole business. And there seems to be no good reason why such a rate cannot be had, if the competing companies keep the peace, as they seem inclined to do. Since expenses have been so greatly reduced, it has become possible to make satisfactory profits at very low rates; the difficulty has been that rates were less even than very low on a very large part of the business.

The Winter Grain Traffic.

Lake navigation was fully open the last week in April, and then closed a period of 20 weeks during which the grain traffic was entirely conducted by rail. During the first four of these weeks, however, the rates remained as they had been during the summer—as low as lake and canal rates. But for the 16 weeks after the 1st of January rates were maintained nearly all the time, varying from 30 to 40 cents per 100 lbs. on grain from Chicago to New York, but only for a few days more than 35 cents. It is under the working of these recent tariffs that it is most important to consider the course of traffic, that we may know how they affect the business of the different railroads and the different markets. We give first, therefore, the receipts of grain at the different Atlantic ports for the first four months of the year (including one week after the opening of navigation).

For the four months from Jan. 1 to April 28, 1877, the receipts of grain of all kinds at the Atlantic ports and the percentages at each have been:

	All grains.	P. c. of total.	All grains.	P. c. of total.
New York.....	9,586,844	29.5	11,641,345	32.4
Boston.....	3,952,868	12.2	2,872,761	8.0
Portland.....	680,993	1.9	1,082,636	3.0
Montreal.....	105,300	0.3	412,640	1.2
Philadelphia.....	5,593,950	17.3	8,182,900	23.6
Baltimore.....	9,897,394	30.6	9,484,339	26.2
New Orleans.....	2,661,720	8.2	2,370,346	6.6
Total.....	32,368,459	100.0	35,946,967	100.0

This shows New York to have received a smaller proportion of the grain than last year, and Baltimore a larger one; but Baltimore and Philadelphia together have received less than in 1876—47.9 per cent. of the total against 48.8. Boston has made a great advance, considering the total amount of its business. New York and Boston together received 41.7 per cent. of the total this year against 40.4 last. So far as the transportation lines are concerned, therefore, the northern ones gained a little this year, and the southern ones lost a little, but the southern ones still have had the larger part of the business.

The circumstances were not greatly different in the two years, except that for the last ten days of April in 1876 rates were reduced by the railroad war, and before that time the agreed differences in favor of Philadelphia and Baltimore were considerably greater than they were this year.

The chief competition for export traffic hitherto, at least so far as New York, Philadelphia and Baltimore are concerned, has been for one grain, corn, and it is therefore desirable to examine the movement of that grain separately, as we have done below:

	1877.	P. c. of total.	1876.	P. c. of total.
Corn:				
New York.....	5,864,341	23.6	4,684,006	20.8
Boston.....	2,692,245	10.8	2,070,289	9.2
Portland.....	365,930	1.5	192,800	0.8
Montreal.....	15,160	0.1	5,800	...
Philadelphia.....	4,446,800	17.9	4,951,100	22.0
Baltimore.....	9,199,000	37.0	8,767,500	38.9
New Orleans.....	2,261,668	9.1	1,877,189	8.3
Total.....	24,845,134	100.0	22,538,784	100.0

Corn is considered peculiarly the grain of Baltimore and Philadelphia, and this year they have 54.9 per cent. of the total receipts of that grain; but they have not maintained their position so well with this as with other grains, for last year they received 60.9 per cent. of this

grain, and while each falls off, both New York and Boston gain, both together receiving 34.4 per cent. in 1877 against 30 per cent. last year. Three-quarters of the total receipts have been corn this year, against five-eighths last year; and this was on the whole rather favorable to the southern than to the northern ports, as the former have an established trade in this grain, but not much (except for local supply) in wheat. For instance, this year 93 per cent. of Baltimore's receipts and 80 per cent. of Philadelphia's were corn, and New York received about twice as much of other grains as both of them put together, and nearly half of the total receipts of other grains at all ports, as it did likewise last year.

For the whole season when lake navigation was closed, the 20 weeks from Dec. 2, 1876, to April 22, 1877, the distribution of receipts at the Atlantic ports was:

	All grains.	P. c. of total.	Corn.	P. c. of total.
New York.....	12,078,180	31.5	5,983,769	22.1
Boston.....	4,621,187	12.0	3,174,111	11.7
Portland.....	710,309	1.9	392,006	1.5
Montreal.....	101,966	0.3	7,550	...
Philadelphia.....	6,684,050	17.5	5,087,000	18.6
Baltimore.....	11,335,704	29.6	10,266,000	37.8
New Orleans.....	2,742,964	7.2	2,248,008	8.3
Total.....	38,274,419	100.0	27,128,844	100.0

Here we have New York and Boston receiving 434 per cent. of the total of all grains, while Philadelphia and Baltimore got 47.1; and of corn the southern ports received 56.4 per cent. against 33.8 per cent. that went to New York and Boston. Thus for the whole winter, so far as corn receipts are concerned, the chief competitive business, the northern markets were not nearly so well off as for the four months since the railroad war ended, as becomes still more evident on an examination of the receipts for the four weeks after navigation closed and while the companies were still carrying wheat from Chicago to New York for 12 cents a bushel. During that period, New York and Boston received but 28 per cent. of the corn and 48 per cent. of all grains, while Baltimore and Philadelphia secured 66 per cent. of the corn and 46 per cent. of all grains.

Putting the percentages of receipts of the two periods—for the four weeks from Dec. 2 to Dec. 30, 1876, and for the 17 weeks of 1877—side by side, we have:

	4 weeks, 1876.	17 weeks, 1877.
New York and Boston.....	28	34 1/2
Baltimore and Philadelphia.....	66	55

The change in the total grain business is in favor of the southern ports, but there is a very great change in the corn movement, and in favor of the northern ones. We would not say, however, that it was wholly due to the differences in rates under the new tariffs. The country which ships chiefly to Baltimore and Philadelphia is south of that which usually ships to ports further north, and its new crop begins to come forward at a time when the country further north is stripped pretty bare of old corn and the new corn is not in condition to ship.

No general conclusion can be drawn from the movement of a single season, but this seems clear, that none of the great exporting markets can complain that its exports have as yet been seriously affected by the differences in rates which have existed since Jan. 1, or claim that the unrestricted competition for business by the railroads previous to that date, after the close of navigation, was more favorable to it than to its rivals. Now that navigation is open, the case is different. If the railroads do not meet the water rates (which they cannot do without loss) the places which depend solely upon the railroads are not likely to maintain the position which they attained when it was as cheap to ship to Baltimore by rail as to New York by water.

Technical Conventions.

Annual conventions of railroad and engineering associations will be held as follows:

- The American Railway Master Mechanics' Association, at St. Louis, Tuesday, May 15.
- The American Institute of Mining Engineers, at Wilkes Barre, Pa., May 22.
- The Master Car-Builders' Association, at Cleveland, Wednesday, June 13.

Record of New Railroad Construction.

This number of the Railroad Gazette has information of the laying of track on new railroads as follows:
Glencoe, Pinconning & Lake Shore.—Opened from Glencoe, Mich., east to Lake, 14 miles.

THE ERIE CANAL was to open May 8. The New York Senate has concurred in the resolution of the lower House which authorizes the Canal Board to reduce the tolls to one half of last year's rates on nearly all the business—that is, to a cent a bushel from Buffalo to Albany. The arguments were that the boatmen lost money on last year's business and that New York will lose its grain trade unless it has a cheaper route to the West. It seems to have been assumed that the rates on the canal will be as low as last year, although the rail rates are 50 per cent. higher; and as to the possibility that the revenue of 1877 may be insufficient to put the canal in order for 1878, the conclusion seemed to be to let 1878 take care of itself. At present it seems very likely that the Erie Canal question will be settled, not by the New York railroads nor by the New York

Assembly, but by Canada, and that in a way not at all agreeable to New York. If the cost of export is not considerably more from Montreal than from New York, then no reduction or abolition of tolls and no amount of enlarging the Erie Canal will turn the export grain over it, when the Welland and St. Lawrence canals let large grain vessels through from Lake Michigan to Montreal.

THE AMERICAN SOCIETY OF CIVIL ENGINEERS has removed from its late quarters on Twenty-third street to No. 104 East Twentieth street, New York, one door east of Fourth avenue, and adjoining All Souls Church. A meeting will be held there this (Friday) evening, at which a paper on "Erush Dams" is expected from Edward P. North, of Tremont, N. Y., and a report on the recent New Orleans convention will be made.

Annual Convention of the American Society of Civil Engineers.

The session of the convention began at the Chamber of Commerce, New Orleans, April 25. The following report of the proceedings is compiled from the New Orleans papers:

Mr. John Bogart called the convention to order and introduced Col. W. Milnor Roberts, Past Vice-President, who delivered the opening address. On calling the roll 85 members were found to be present.

The programme for the week was announced to be: Sessions on Tuesday, Wednesday and Thursday, and also inspection of the levees, drainage, street, railroads, fireless locomotives, and other objects of interest, to conclude with a dinner at Lake Ponchartrain, in the evening, for which a special train was provided.

Friday and Saturday, a trip to the passes.
An invitation was received and accepted for an excursion to the proposed location of the Barataria Ship Canal.

PROFESSIONAL PAPERS AND DISCUSSIONS.

Under this head, Mr. Charles Macdonald, of New York, discussed the failure of the Ashtabula bridge, explaining the reasons for the failure of that structure.

Mr. Robert Briggs, of Philadelphia; Mr. Thomas C. Clarke, of Phoenixville; Mr. Theodore Cooper, of New Jersey; Mr. Chas. Hilton, of Albany, N. Y.; Mr. Searles, of Rochester, N. Y., and Mr. Rotech, of Fall River, Mass., also discussed the same subject.

A mathematical discussion of the quantity of material and the strains on the various parts of bridges was the next paper, read by Mr. Charles E. Emery, of New York.

Mr. C. Shaler Smith then read a paper on the Ashtabula Bridge, explanatory of its failure, from a scientific and logical point. Mr. Smith, in conclusion of his paper, offered the following resolution, which was unanimously adopted: That a committee of five, whose names shall be selected by letter ballot, shall be appointed to draft a law covering the points outlined on pages 125, 126, 127 and 128 of the May number of *Transactions* for 1875, adding thereto the necessary provisions to secure the inspection by experts of all questionable bridges now in existence. And further that this law, so drafted, shall be submitted, together with a resolution recommending its adoption by the various State legislatures, to this Society for letter ballot, and, if approved, that printed copies of the said law and the accompanying resolution be sent to the members of the Society, with a request that they move actively, each in his own State, towards procuring the passage of the specified law by the various State legislatures during the coming winter.

At the evening session a paper was read, prepared by the late Col. G. W. B. Bayley, upon the subject of levees, rise and fall of the river, floods, etc.

An invitation to visit the harbor protection boat was accepted.

Mr. Herschel, of Boston, presented, from the committee, a report upon the subject of the metric system, and urging in that report that Congress adopt that system.

A resolution was introduced creating a committee of five to report upon the subject referred to, and that the committee consult with other societies throughout the United States.

The resolution went over for discussion.
A paper prepared by Col. Milnor Roberts was read, the subject being the Society of Civil Engineers and its future.

Prof. Forshey read a memoir of the late G. W. B. Bayley. Adjourned until 10 o'clock next morning.

SECOND DAY.

The committee to whom, at the last annual meeting, was referred the question of tests of iron and steel, made a lengthy report, whereupon a committee of three was appointed to draft resolutions expressing the thanks of the convention for the very able report, and to suggest a proper method to bring the subject before Congress.

Gen. G. T. Beauregard was introduced to the convention by the chairman and met with a cordial reception in the way of applause, for which reception he thanked the gentlemen present.

The secretary announced that Capt. Eads had chartered the steamboat La Belle to take the members of the convention to the jetties, and that the boat would leave the head of Canal street at ten o'clock Friday morning, and that the convention would return on Sunday morning, and that all the expense the members would be to would be for meals.

The chairman announced that the convention would visit the ice works in the city, and also would visit Carrollton and examine the manner of charging the steam dummies. The levee at Carrollton would also be inspected, as would also the draining machines. This for Thursday's programme, and they would wind up the day with the dinner.

The convention would meet at 10 in the morning, and first visit the cotton presses and would leave for the old lake end on the 6:30 p. m. train.

It was then decided that the convention would leave New Orleans on Tuesday for their homes.

An invitation was read, asking the convention to visit Salt Island, on their way to Galveston.

The convention then took a recess until 2 p. m., and went into a business meeting.

The following report was presented by the committee appointed to consider report on tests of iron and steel.

Whereas, In 1872 a committee was appointed of members of the American Society of Civil Engineers, to take into account and to ascertain the best way of establishing a board for the testing of such metals and alloys thereof as form parts of such structures and machines as are required for the use of the citizens of this country; and,

Whereas, In pursuance of such appointment the committee proceeded in their labors so far as to obtain favorable action from the Congress of the United States, not only in a law authorizing the creation of a board for the purpose of making such tests, but also, appropriated money to be expended by said board in the purchase of the necessary machinery and in the making of such tests; and,

Whereas, At a late session of Congress a law was passed by which said board would cease to exist on the expenditure of the money then appropriated; now, therefore, be it

Resolved, That this society deem the tests proposed to be made to be of national importance; they, therefore, ask that so much of the sundry civil appropriation bill passed by the

Congress as provides that the board to test iron, steel and other metals shall be discontinued, when the money appropriated for its use by the same shall have been expended, be repealed, and that the unexpended balance in the hands of the board shall be reappropriated, and such further appropriations be made for the use of the board as it may require to complete the investigation it has undertaken, the sum required for the coming year being \$40,000.

Resolved, That every member of this society be urged to use such influence as they may possess to obtain favorable and immediate action by the Congress of the United States in furtherance of the object here prayed for.

Resolved, That the above resolutions be printed, and that each member of the society be furnished with several copies thereof to be used in furtherance of the object sought, and that reports of their action in the premises shall be sent by the members to the secretary, giving the names of such members of Congress as have been seen or addressed on the subject.

JOHN GRIFFIN,
G. BUSCAREN,
EDWARD S. PHILBRICK,
Committee.

This was unanimously adopted, when a recess was taken until 7 p. m.

EVENING SESSION.

The convention met at 7 p. m., when the convention went into the selection of a nominating committee to select officers for the ensuing year. Some ten or twelve names were put in nomination, and in order that the selection might result in the election of those residing in different parts of the country, a committee of three was appointed to make the selection from the list, and after a short consultation, the committee reported the following names, the report being adopted:

Wm. E. Worthen, New York; Wm. Booy Smith, Illinois; Fred. De Funiak, Kentucky; Jos. P. Wilson, Pennsylvania; C. G. Forshey, Louisiana.

Prof. Forshey read an essay upon inventions, and suggested various methods of protection to inventors, of improving the signal service and other subjects.

Col. Hardee presented and read a paper, giving his experience in a hurried survey of the railroad from Jackson, Miss., to Jackson, Tenn., in which the lines were run at the rate of nearly 33 miles per day.

Mr. Buscaren, of Ohio, explained the manner in which the Cincinnati Southern Railroad bridge over the Kentucky River was tested, and giving the vibrations in the bridge and piers, with a blackboard explanation which was exceedingly interesting.

On motion, a resolution of thanks was tendered to all who had extended courtesies to the Society; also to the presiding officer.

Capt. Cowdon, the projector of the Barataria Ship Canal, was introduced to the convention.

At 9:30 P. M. the convention adjourned sine die.

THE THIRD DAY

was spent in visiting objects of interest in New Orleans, and in the evening the annual dinner was had at Lake End.

THE FOURTH DAY

The Society embarked for Southwest Pass, and thence to South Pass, to examine the jetties and other works which Captain Eads is constructing there. Much time was spent in examining these great works, under the direction of Mr. E. L. Corbelle, Captain Eads' Principal Assistant. A day (Friday) was spent on the way thither, including a visit at a fine plantation below the city. The party returned during the night of Saturday, reaching New Orleans Sunday morning. Monday, a visit was paid to Bonnet Carre crevasse. Most of the visitors started northward Tuesday.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Lake Shore & Michigan Southern.—At the annual meeting in Cleveland, O., May 2, the following directors were chosen: Albert Keep, Chicago; Henry B. Payne, Amasa Stone, Cleveland; Wm. L. Scott, Charles M. Reed, Erie, Pa.; Russell Brown, Warren, Pa.; Wm. H. Vanderbilt, Cornelius Vanderbilt, Wm. K. Vanderbilt, Augustus Schell, Samuel F. Barger, John E. Burrell, Francis P. Freeman, New York. The new directors are Messrs. Cornelius and Wm. K. Vanderbilt and R. Brown, who succeeded Cornelius Vanderbilt, deceased; Robert L. Crawford and Andrew D. White. The board elected Wm. H. Vanderbilt President, to succeed his deceased father, and dropped the office of Second Vice-President; the other officers were re-elected or re-appointed, making the list as follows: President, Wm. H. Vanderbilt, New York; Vice-President, Augustus Schell, New York; Secretary and Treasurer, Edwin D. Worcester, New York; Assistant Secretary and Assistant Treasurer, pro tem, N. Bartlett, Cleveland; Auditor, C. P. Leland, Cleveland; General Manager, John Newell, Cleveland; General Superintendent, Charles Paine, Cleveland; General Freight Agent, Addison Hills, Cleveland; Assistant General Freight Agents, Charles M. Gray, Chicago, George H. Valliant and J. T. McKay, Cleveland; General Ticket Agent, J. W. Cary, Cleveland; Chief Engineer, L. H. Clarke, Cleveland; Purchasing Agent, A. C. Armstrong, Cleveland; General Master Mechanic, James Sedgley, Cleveland; Master Car Builder, John Kirby, Cleveland.

Louisiana & Missouri River.—At the annual meeting in Louisiana, Mo., May 2, the following directors were chosen: J. P. Seabree, W. King, J. J. Mitchell, George Straut, C. H. Foster, R. P. Tansey, H. V. P. Block, W. H. Mitchell, C. Beckwith. The board elected R. P. Tansey, President; W. King, Vice-President; Robert Park, Secretary and Treasurer. The road is leased to the Chicago & Alton.

Hamilton & Northwestern.—At the annual meeting in Hamilton, Ont., May 1, the following directors were chosen: John Stuart, Wm. Hendrie, John Proctor, M. Leggat, James Turner, E. Gurney, Wm. J. Copp, P. W. Dayfoot. The board elected John Stuart, President, and E. Gurney, Vice-President.

Illinois Central.—Mr. Joseph F. Tucker, late General Superintendent, is appointed Master of Transportation and will have charge of all transportation over the company's lines. Mr. E. T. Jeffrey, formerly Assistant Superintendent of Machinery, succeeds Mr. Tucker as General Superintendent. Mr. Jeffrey has served the company from boyhood, nearly all the time in the Chicago shops.

Pittsburgh, Titusville & Buffalo.—At the annual meeting in Philadelphia, May 7, Mr. Thomas H. Dudley was chosen President, with the following directors: John Scott, James H. Campbell, John W. Moffly, John S. Ritter, Joseph C. Herr, Charles M. Foulke.

Michigan Railroad Commissioner.—The Governor of Michigan has appointed Hon. Wm. B. Williams Railroad Commissioner, in place of Stephen S. Cobb, resigned. Mr. Williams is a lawyer of good standing and has been a representative in Congress. He resides at Allegan.

Ware River.—At the annual meeting in Palmer, Mass., May 2, the old board was re-elected, as follows: C. A. Perley, Baldwinville, Mass.; W. W. Whitney, Winchendon, Mass.; C. A. Stevens, Ware, Mass.; E. B. Gillett, Westfield, Mass.; Chester W. Chapin, James A. Rumrill, Springfield, Mass.; Wm. Mixer, Boston. The road is leased to the Boston & Albany.

Baltimore, Hampden & Tusconovum.—At the annual meet-

ing in Baltimore, May 2, the following directors were chosen: James L. Sutton, George Merryman, James R. Clark, George Drakely, W. R. Monroe, Joseph A. Edmondson, Wm. Martien.

Port Wayne, Jackson & Saginaw.—Mr. H. Bromley has been appointed General Freight Agent, in place of E. R. Parker, resigned.

Central of Iowa.—Mr. J. G. Johnston has been appointed Superintendent.

Central Ohio.—At the annual meeting in Columbus, O., April 25, the following directors were chosen: Hugh J. Jewett, J. R. Swan, Wm. Dennison, W. B. Brooks, J. W. Hall, Daniel Applegate, John King, Jr., Joseph Rieman, J. W. Jenkins, J. G. Harvey, W. C. Quincy, W. H. Clement, Robert Garrett. The road is leased to the Baltimore & Ohio.

Union Pacific.—The Secretary of the Interior has appointed the following Government directors for the ensuing year: John C. S. Harrison, of Indiana; Francis B. Brewer, of New York; James S. Wilson, of Iowa; Joseph H. Millard, of Nebraska; Daniel Chadwick, of Connecticut. Mr. Chadwick succeeds J. A. Tibbits, of the same State; the others are re-appointed.

Mr. A. A. Egbert, formerly of the Atchison, Topeka & Santa Fe, is appointed Superintendent of the Western Division, in place of J. H. Clark, promoted to be Assistant General Superintendent.

Empire Transportation Co.—Mr. James S. Swartz has been chosen Treasurer. His office is at No. 1,123 Chestnut street, Philadelphia.

Glencoe, Pinconning & Lake Shore.—The officers are: President and General Manager, George Campbell; Vice-President, Hugh Campbell; Secretary and Treasurer, E. B. Foss. The offices are at Bay City, Mich.

Jacksonville, Pensacola & Mobile.—Mr. F. B. Papy has been appointed General Superintendent, with office at Tallahassee, Fla. He has been connected with the road a long time.

Lake Superior & Mississippi.—Mr. C. F. Cruft is appointed Auditor and General Ticket Agent, in place of E. D. Haley, deceased.

Scioto Valley.—Mr. J. B. Peters, Superintendent, is acting as General Freight Agent also. Mr. J. P. Curry has been appointed Auditor.

Houston & Texas Central.—At the annual meeting in Houston, Tex., May 7, the following directors were chosen: E. W. Cave, A. Groesbeck, A. S. Richardson, George Jordan, Houston, Tex.; Charles Fowler, Galveston, Tex.; C. A. Whitney, A. C. Hutchinson, New Orleans; Charles Morgan, John J. Cisco, New York. The new board is entirely in the Morgan interest, the only old directors remaining being Messrs. Cisco, Richardson and Groesbeck, though Messrs. Cave and Fowler have been in the board a few weeks. The directors displaced are Messrs. Wm. E. Dodge, Wm. M. Rice, Moses Taylor, John I. Blair, Wm. R. Baker, F. A. Rice, A. A. Van Alstyne and Cornelius Ennis, there being two directors less than last year. The board elected C. A. Whitney President; George Jordan, Vice-President; A. S. Richardson, Secretary; E. W. Cave, Treasurer. Mr. Whitney succeeds Wm. E. Dodge; Mr. Jordan, formerly Superintendent of the Memphis & Charleston, takes the place Mr. Groesbeck has held for a few weeks, and Mr. Cave replaces F. A. Rice. Vice-President Jordan will probably have the immediate management of the road.

Montclair & Greenwood Lake.—At the annual meeting in Jersey City, N. J., May 7, the following directors were chosen: J. W. Drexel, Smith Ely, Jr., Cyrus W. Field, Conrad N. Jordan, D. A. Lindley, H. B. Low, J. de Neufville, J. W. Pinchot, Remington Verman. This is in part a new board, Messrs. Ely, Jordan, Lindley and Verman being, we believe, the only old directors remaining. The board elected Cyrus W. Field President.

St. Louis, Iron Mountain & Southern.—Col. W. R. Arthur has been appointed General Manager and assumed the duties of that position May 7. Col. Arthur was at one time General Superintendent of the Illinois Central and more lately of the St. Louis, Kansas City & Northern. A circular from Mr. Arthur states that all instructions and orders will issue from the General Superintendent (Mr. A. W. Soper), and all reports be made to him as heretofore.

Delaware & Hudson Canal.—At the annual meeting in New York, May 8, the following managers were chosen: John Jacob Astor, Legrand B. Cannon, James M. Halstead, Robert S. Hone, Robert Lenox Kennedy, Abiel A. Low, J. Pierpont Morgan, Levi P. Morton, James Roosevelt, James R. Taylor, George Cabot Ward, New York; Thomas Cornell, Kingston, N. Y.; Thomas Dickson, Scranton, Pa. The only new director is Mr. Morton, a well-known New York banker, who succeeds Mr. Wm. J. Hoppin, now Secretary of the American Legation in London.

Chicago, Milwaukee & St. Paul.—Mr. Wm. G. Swan is appointed General Freight Agent, in place of O. E. Britt, resigned. Mr. Swan was at one time Assistant to Mr. Britt and was afterward Superintendent of the West Wisconsin. He has also been General Eastern Agent of the Chicago & Northwestern.

Ashuelot.—At the annual meeting in Keene, N. H., May 8, the following directors were chosen: Samuel W. Hale, Farnum E. Lane, Elisha F. Lane, Herbert E. Lane, Henry Colony, John E. Colony, Frank H. Colony.

PERSONAL.

—Mr. John A. Sheaff, an old engineer, died at his residence in Lancaster, Pa., April 30, aged over 70 years. He was employed many years ago on the Columbia Railroad, the Tidewater Canal and on several railroads in Pennsylvania and New Jersey.

—Mr. E. B. Hayward, for many years foreman of the Illinois Central foundry in Chicago, is now in charge of the car-wheel foundry of the Ohio Falls Car Works, at Jeffersonville, Ind.

—Mr. C. W. Buchholz, formerly Resident Engineer of the Philadelphia & Reading Railroad, is in charge of the machine shops of the Seyfert & McManus Iron Co., at Reading, Pa.

—In Wilmington, Del., May 2, a meeting of employees of the Philadelphia, Wilmington & Baltimore road was held, at which were passed resolutions of respect for Mr. George W. Perry, who died recently, and was formerly for many years Master Mechanic of the road.

—President Franklin B. Gowen, of the Reading Company, sailed for Europe May 5. It is said that he has gone for the purpose of consulting with the English holders of the company's securities.

—Mr. Abel Kimball, lately appointed General Superintendent of the Chicago, Rock Island & Pacific, was born in New Hampshire and held his first position on the Connecticut River Railroad, serving afterward on the Cochochee Railroad in New Hampshire and the Newburyport road in Massachusetts. In 1856 he was appointed Master Mechanic and two years later Superintendent of the Mississippi & Missouri Railroad. When that road was consolidated with the Chicago, Rock Island & Pacific in 1866 he became Division Superintendent, but was shortly afterwards appointed Assistant General Superintendent, which position he held until his recent promotion. Mr. Kimball is considered an able manager and is thoroughly acquainted with the lines under his charge.

—Capt. Dolphus Torrey, formerly Superintendent of the Central Division of the Pullman Car Company's lines, and

lately Superintendent of the Bureau of Transportation at the Centennial Exhibition, has been appointed General Agent of the International Exhibition Company, of Philadelphia. His jurisdiction extends over all matters connected with the press, advertising, admissions, tickets and transportation. Capt. Torrey is exceptionally well qualified for this position by his peculiar experience and tried ability.

—Mr. W. J. Ross is no longer Superintendent of Transportation of the Memphis & Charleston Railroad.

—Mayor Ely, of New York, last week sent into the Board of Aldermen the name of Thomas J. Brown, Superintendent of the Erie Railway ferries, as his nominee for the important position of Park Commissioner. The nomination was rejected, for political reasons solely.

—The Committee on Science and the Arts of the Franklin Institute has recommended the award of the Elliott Cresson gold medal to Mr. P. H. Dudley for his dynamograph for measuring railroad resistances.

—Hon. Francis B. Crowninshield, for a long time a director and President of the Boston & Lowell, and at one time President of the Old Colony, died at his residence in Marblehead, Mass., May 8, aged 68 years. He was a man of considerable property and was prominent as a lawyer and a politician of much influence, although he had held public office but seldom.

—Mr. O. E. Britt has resigned his position as General Freight Agent of the Chicago, Milwaukee & St. Paul Railway and intends to enter into other business.

—Mr. W. H. Franklin, Assistant Superintendent of the Western Union Railroad, died suddenly last week while on his return to Racine, Wis., from a visit East.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods have been reported as follows:

Year ending Dec. 31:	1876.	1875.	Inc. or Dec.	P. c.
Hamilton & North-western.....	\$91,834	\$78,893	Inc..	12,941 14.4
Expenses.....	50,159	49,078	Inc..	1,081 2.3
Net earnings.....	\$41,675	\$29,815	Inc..	\$11,860 39.9
Earnings per mile.....	2,870	2,465	Inc..	405 16.4
Per cent. of exps.....	54.61	62.20	Dec..	7.59 13.3
Pittsburgh, Titusville & Buffalo.....	706,019	899,796	Dec..	193,777 27.4
Expenses.....	455,828	570,876	Dec..	115,048 25.3
Net earnings.....	\$250,191	\$328,920	Inc..	\$78,729 31.5
Earnings per mile.....	6,139	7,042	Dec..	903 14.6
Per cent. of exps.....	64.56	70.50	Dec..	5.94 8.4
Year ending March 31:	1876-77.	1875-76.		
Pennacola & Perdido.....	\$36,949	\$36,975	Dec..	\$26 0.1
Earnings per mile.....	4,104	4,108	Dec..	4 0.1
Four months ending April 30:	1877.	1876.		
Burlington, Cedar Rapids & Northern.....	\$287,687	\$387,633	Dec..	\$99,946 34.8
Canada Southern.....	586,734	598,783	Dec..	12,049 2.0
Central Pacific.....	4,734,039	4,628,261	Inc..	115,778 2.4
Chicago & Alton.....	1,360,204	1,371,973	Dec..	11,769 0.9
Chicago, Milwaukee & St. Paul.....	1,764,460	2,263,263	Dec..	498,803 28.0
Illinois Central, Illinois lines.....	1,460,360	1,697,288	Dec..	236,928 16.0
Missouri Pacific.....	1,180,699	1,189,956	Dec..	9,257 0.8
Missouri, Kansas & Texas.....	941,501	971,284	Dec..	29,783 3.1
St. Louis, Alton & T. H. Belleville Line.....	167,878	158,952	Inc..	8,926 5.3
St. Louis, Iron Mt. & Southern.....	1,360,718	1,209,405	Inc..	151,313 12.5
St. Louis, Kan. City & Northern.....	1,014,210	1,038,186	Dec..	23,976 2.3
St. Louis & San Francisco.....	412,665	405,097	Inc..	7,568 1.8
Toledo, Peoria & War-saw.....	333,483	432,245	Dec..	98,762 29.6
Wabash.....	1,310,180	1,364,728	Dec..	54,548 4.2
Three months ending March 31:				
Atchison, Topeka & Santa Fe.....	\$460,344	\$441,796	Inc..	\$18,548 4.0
Net earnings.....	191,099	216,527	Dec..	25,428 13.3
Per cent. of exps.....	58.50	51.06	Inc..	7.44 12.6
Kansas Pacific.....	587,643	694,625	Dec..	106,982 18.2
St. Joseph & Denver City.....	94,545	78,907	Inc..	15,638 16.5
St. Paul & Sioux City.....	91,203	123,904	Dec..	32,701 35.8
Sioux City & St. Paul.....	52,391	81,047	Dec..	28,656 54.7
Union Pacific.....	2,693,976	2,235,476	Inc..	458,500 20.5
Two months ending Feb. 28:				
Chicago, Rock Island & Pacific.....	\$990,588	\$1,034,343	Dec..	\$43,755 4.3
Denver & Rio Grande.....	82,040			
Net earnings.....	32,037			
Per cent. of exps.....	60.99			
Month of March:				
Kansas Pacific.....	\$230,284	\$218,760	Inc..	\$11,524 5.3
St. Joseph & Denver City.....	34,547	23,968	Inc..	10,579 44.1
St. Paul & Sioux City.....	31,917	42,603	Dec..	10,686 33.5
Sioux City & St. Paul.....	19,116	27,933	Dec..	8,817 46.1
Union Pacific.....	1,027,522	873,351	Inc..	154,171 17.7
Month of April:				
Bur. Cedar Rapids & Northern.....	\$72,435	\$68,164	Dec..	\$4,271 5.9
Canada Southern.....	172,973	168,452	Inc..	4,521 2.7
Central Pacific.....	1,416,009	1,427,085	Dec..	11,076 0.8
Chicago & Alton.....	338,095	363,999	Dec..	25,904 7.7
Chicago, Milwaukee & St. Paul.....	615,000	650,961	Dec..	35,961 5.8
Illinois Central, Illinois lines.....	947,411	402,284	Dec..	54,573 13.5
Illinois Cent., Iowa lines.....	99,998	127,985	Dec..	27,987 27.9
Missouri Pacific.....	328,372	283,733	Inc..	44,639 13.7
Missouri, Kansas & Texas.....	221,657	214,238	Inc..	7,419 3.4
St. Louis, Alton & T. H. Belleville Line.....	36,407	38,198	Dec..	1,791 4.9
St. Louis, Iron Mt. & Southern.....	261,108	273,995	Inc..	12,887 4.9
St. Louis, Kan. City & Northern.....	264,436	234,001	Inc..	30,435 11.5
St. Louis & San Francisco.....	97,946	94,808	Inc..	3,138 3.3
Toledo, Peoria & Warsaw.....	90,113	118,048	Dec..	27,935 31.0
Wabash.....	367,705	375,704	Dec..	8,000 2.1

Petroleum Exports.

The exports for the four months from Jan. 1 to April 28 have been:

Gallons.....	1877.	1876.	1875.	1874.
	74,099,892	65,008,946	54,291,540	59,976,559
This year exports are given from Richmond and Portland, which together exported about 2½ per cent. of the total. New York this year exported 50 per cent. more than last year and 71 per cent. of the total; Philadelphia, 96 per cent. less than last year and 15½ per cent. of the total; Baltimore, 35 per cent. less than last year and 10½ per cent. of the total.				

Petroleum Movement.

Stowell's Petroleum Reporter gives the production of crude

petroleum from the Pennsylvania oil regions for March at 337,337 barrels; shipments for the month were 913,919 barrels. Shipments of refined oil from Pittsburgh for the month were: Pennsylvania Railroad, 25,097 barrels; Baltimore & Ohio, 14,969; Ohio River and Chesapeake & Ohio Railroad, 5,776; westward by rail, 725; total, 46,566 barrels.

Grain Movement.

Receipts and shipments for the 17 weeks ending April 28 have been, flour in barrels and grain in bushels:

	1877.	1876.	Inc. or Dec.	P. c.
Flour—				
Lake ports' receipts....	1,385,325	1,589,202	Dec.. 203,877	14.7
" " shipments..	1,296,527	1,729,225	Dec.. 432,698	24.9
Atlantic ports' receipts..	2,147,189	2,822,584	Dec.. 675,395	24.0
Wheat—				
Lake ports' receipts....	5,225,301	10,840,820	Dec.. 5,615,519	51.8
" " shipments..	4,038,048	7,401,141	Dec.. 3,363,093	45.4
Atlantic ports' receipts..	1,879,793	7,217,075	Dec.. 5,337,282	74.0
Corn—				
Lake ports' receipts....	20,585,868	19,092,676	Inc.. 1,493,192	7.8
" " shipments..	13,220,318	15,152,658	Dec.. 1,932,340	13.3
Atlantic ports' receipts..	24,825,108	22,137,364	Inc.. 2,687,744	12.2

All Grains—
Lake ports' receipts.... 32,799,670 38,305,049 Dec.. 5,505,379 14.3
" " shipments.. 21,862,053 27,461,337 Dec.. 5,599,284 20.4
Atlantic ports' receipts.. 32,338,234 36,128,277 Dec.. 3,790,043 10.5

For the past four years the movement of all grains for this period (the first four months of the year) have been:

	1877.	1876.	1875.	1874.
Lake ports' receipts....	32,799,670	38,305,049	34,252,426	45,399,636
" " shipments..	21,862,053	27,461,337	16,613,222	25,025,359
Atlantic ports' receipts..	32,338,234	36,128,277	29,680,252	32,420,042

Compared with the previous years, the receipts of lake ports are 14 1/2 per cent. less than in 1876, 4 1/2 per cent. less than in 1875, and 29 per cent. less than in 1874. The shipments of these ports compared with previous years have been: 1876, 20 1/2 per cent. less; 1875, 31 1/2 per cent. more; 1874, 12 1/2 per cent. less. The Atlantic ports' receipts are this year 10 1/2 per cent. less than in 1876, 9 per cent. more than in 1875, and almost the same as in 1874 (1/2 of one per cent. less).

The shipments by lake and rail since navigation opened this year have been:

Week ending—	By lake.	By rail.	Total.	P. c.
April 21	397,051	1,381,480	2,368,531	83.9
April 28	2,078,763	1,303,754	3,382,517	33.4
Total	3,065,814	3,185,234	6,251,048	51.0

The percentage shipped by rail for the last week, which was 84 per cent. this year, was 56 in 1876, 96 in 1875 and 58 in 1874.

Coal Movement.

Coal tonnages for the four months ending April 28 were as follows, the tonnage in each case being that originating on the line to which it is credited:

	1877.	1876.	Inc. or Dec.	P. c.
Anthracite:				
Philadelphia & Reading..	1,519,739	990,355	Inc.. 529,384	53.5
Northern Central, from Shamokin Div. and Summit Branch.....	146,760	130,049	Inc.. 16,711	12.9
Cent. of N. J., Lehigh Div.	878,224	593,305	Inc.. 284,919	48.0
Danville, Hazleton & Wilkesbarre.....	5,625	11,910	Dec.. 6,285	52.8
Pennsylvania Canal.....	35,651	30,570	Inc.. 5,081	16.6
Lehigh Valley.....	1,117,106	907,495	Inc.. 209,611	23.1
Pennsylvania & New York.	14,489	8,412	Inc.. 6,077	72.3
Del. & Hudson Canal Co.	623,635	395,518	Inc.. 228,117	57.7
Del. & Hudson Canal Co.	641,755	543,016	Inc.. 98,739	14.3
Pennsylvania Coal Co.....	302,590	292,156	Inc.. 20,434	7.2
State Line & Sullivan ..	3,874	17,424	Dec.. 13,550	77.9
Total anthracite	5,289,448	3,910,210	Inc.. 1,379,238	35.3
Semi-bituminous:				
Cumberland, all lines....	326,106	393,189	Dec.. 67,083	17.1
Huntingdon & Broad Top.	48,719	91,761	Dec.. 43,042	46.9
Tyone & Clearfield	437,751	369,772	Inc.. 67,979	18.4
Total semi-bituminous..	812,576	854,722	Dec.. 42,146	4.9

Bituminous:
Barley R. R..... 116,877 113,680 Dec.. 3,197 2.8
The anthracite production continues very large, the increase being proportionally greater in April than in the three previous months.

THE SCRAP HEAP.

Railroad Manufactures.
The North Chicago Rolling Mill is making rails for the Maple Valley road in Iowa and has several other contracts for iron rails.
The Hinkley Locomotive Works, at Boston, are building two heavy freight engines for the Fitchburg and one for the Boston & Lowell.
The Seamless Steel Ware & Frog Co., whose works are at Harrisburg, Pa., has begun the manufacture of steel wheel-barrs, which are claimed to be exceedingly strong, light and durable. The body of the barrow and the handles are stamped out of sheet steel, and the wheel is of cast-iron with a steel tire.
The Pennsylvania Railroad shops at Altoona are building 10 new locomotives.
Wick, Kramer & Goff are running their spike works, at Youngstown, O., full time. They make their own iron, using pig from the Briar Hill furnace.
The rail mill of the Vulcan Iron Works, at St. Louis, is running on steel rails. No iron rails are being made at present.
The Himrod Iron Co., at Youngstown, O., has one stack in blast and is preparing to blow in its second stack.
Reese, Graff & Woods, at Pittsburgh, are putting up a new mill for rolling sheet iron.
The Pittsburgh Manufacturer states that more river steamboats and barges are now under construction in that city and vicinity than were built during the whole of 1876.
The extensive iron works at Wheatland, Pa., are now in the hands of Mr. T. A. Wood.
The Reading Railroad shops, at Reading, Pa., are building 50 iron dump cars for carrying coal.
The Dickson Manufacturing Co. has a good deal of locomotive and other work on hand in its shops at Scranton and Wilkes Barre, Pa.
The Laconia Car Co., at Laconia, N. H., now employs 200 men and is turning out one box car per day.
The Laclede Rolling Mill, at St. Louis, is running double turn and employs 425 men.
The Harrisburg (Pa.) Car Works have been shipping a number of oil tank cars for the Standard Oil Co.
The iron works of Seyfert, McManus & Co., at Reading, Pa., have a good deal of work on hand.
There is talk of building works for the manufacture of wrought-iron pipe at Chattanooga, Tenn.
The Barney & Smith Manufacturing Co. at Dayton, O., has been running quite full of orders of late. It has just shipped two more coaches to the Columbus & Toledo Railroad, has four for the St. Louis, Kansas City & Northern, three for the North Pacific Coast (California), and has furnished 150 oil tank cars for the Standard Oil Co., of Cleveland, and is now building 200 more for it. It is also making 50 cars for the Illinois & St. Louis Railroad, and has other small orders.
The New York Supreme Court has denied the application of the Prince's Metallic Paint Co. to restrain Prince Brothers from using the word "Prince" as part of their trade-mark. The two trade marks are "Prince's Metallic Paint" and

"Prince Brothers' Iron Ore Paint," and the Court held that the latter was no infringement on the former.

A Singular Attempt at Train Wrecking.

On the evening of May 2, as a passenger train on the New Jersey Central was running into the depot at Jersey City, two young men jumped on the baggage car and began to disconnect the couplings of the vacuum brake hose. Fortunately, they were seen by some of the trainmen, who readjusted the couplings and arrested the men. The train was running pretty fast, and if the brakes had failed to work it would probably have gone through the end of the depot and into the river, as a train on the same road did several months ago.

Air-Brakes for Managers.

A Georgia paper, noting the fact that air-brakes are to be put on the trains of a railroad in that State, remarks that if air-brakes could be put on the managers of the road also the stockholders would feel easier—a sentiment which might find echoes in other States besides Georgia.

A Lost Locomotive.

If any of our readers should find a stray locomotive without any apparent owner, he will please capture and forward to Peoria, where one is missing, as appears from the annexed paragraph taken from the Chicago Tribune. It may be difficult to identify the locomotive, however, as no description is given:

"An engine—formerly known as No. 75, of the Indianapolis, Bloomington & Western Railroad, afterward as No. 9 on the Peoria & Springfield, and still later as No. 6 on the Peoria, Atlanta & Decatur—has, since the change of receivers on the Peoria & Springfield road, turned up missing. It is said the engine was recently made the property of A. S. Ware, of Pekin, by a decision of the United States Supreme Court. Bob Ingersoll is said to be a third owner, as is also D. T. Thompson, of Pekin, formerly of the construction company of Thompson, Griggs & Co. It is said that Ware sold the engine to Gen. Wright, of the Indianapolis, Bloomington & Western road, for \$1,000. The Peoria Circuit Court will take possession of the engine, when found, as the property of the Peoria & Springfield road."

Tiffany Refrigerator Car.

The first Tiffany refrigerator car run east of Chicago arrived in New York May 7 with a load of dressed hogs. These had been seven days on the way and arrived in good condition, with a small consumption of ice. This week also a car arrived in Philadelphia from Kansas City. These cars heretofore have run chiefly between Colorado and Chicago. The chief peculiarity of the car is the use of an air space around the car body as a non-conductor, while the ice is exposed directly to the air in which the meat is hung.

Prices.

Pig iron is lower. No. 1 foundry is generally quoted at \$19 per ton in New York, No. 2 at \$18, and forge at \$17 to \$17.50, and it is reported that No. 1 has been sold for \$18, and that a lot of iron in Philadelphia was sold for \$15. The Engineering and Mining Journal quotes iron rails at the mills at \$33 to \$37; steel at \$46 to \$50; old rails, \$19.

An Advertising Car.

The ingenuity of showmen is exhaustless. One of its latest exhibitions is in a car which has been built for Adam Forepaugh by the Barney & Smith Manufacturing Co., of Dayton, Ohio. The car is to be used for the advance agent of the showman, and contains a large carpeted office for his accommodation, eight sleeping berths, four of them being for the bill-posters, toilet apparatus, and other conveniences which will enable the agent to take his office with him wherever he goes, without much dependence on hotels. This car is taken, usually on passenger trains, by special contract with the railroad companies, usually about two weeks in advance of the show itself. The advertising is on the sides of the car, where are represented elephants, lions, tigers, giraffes, camels, and other beasts amid tropical scenery, and engaged in the desperate conflict which stirs the blood of the small boy, and implants in him that irresistible desire to "see the show" which it is the mission of showmen to satisfy, and their ambition to implant and foster. The showman's portrait also adorns each side of the car, and there is some other advertising, as a view "from river to mountain," by the Atchison, Topeka & Santa Fe Railroad, a scene on the Pennsylvania Railroad, not to omit a view of the Barney & Smith great works, and the legend that "this car, the sleepers, dining, elephant palace, horse, box and flat cars were built, painted and decorated complete in 60 days by the Barney & Smith Manufacturing Co., Dayton, O., for the Forepaugh Show." Showmen are becoming quite important customers for cars, having left the road and committed themselves to the railroad quite generally.

An Engineer's Good Points.

The Raleigh (N. C.) News has the following: "Mr. Rufus Horton, a locomotive engineer on the Raleigh & Gaston Railroad, is perhaps the oldest engineer in North Carolina in point of continuous service. He ran for years on the Wilmington & Weldon Railroad, in days when there were no cabs on engines; when engineers wore kid gloves while running their locomotives, and when people in the country would go to the stopping places on the railroads and want to take them to their homes in carriages. Mr. Horton cannot read or write, but remembers to a cent every grocery bill he ever paid in his life. He never forgets anything. When they change the schedule somebody reads the new schedule over to him one time, and he plumbs it with absolute accuracy from the first trip."

A Collision Not Avoided.

"Pull out, Bill!" shrieked an engineer's son to his playmate, a brakeman's boy, who was in imminent danger of getting smashed by his mother, who was coming after him. "Git on the main line, and give her steam! Here comes the switch engine!" But before the juvenile could get in motion she had him by the ear, and he was laid up with a hot box.—Burlington Hawk-Eye.

Welding Cast Steel.

Fiala, of Prague, uses pulverized white marble in welding cast steel. The two pieces to be welded are heated, then rolled in the marble dust, then immediately brought together and hammered. It is said that small pieces can be hammered in this way.

OLD AND NEW ROADS.

Foreclosure Sales.

Since our last issue news has been received of the following sales of railroad property under foreclosure:
Lake Superior & Mississippi, at St. Paul, Minn., May 1, including 131 miles of road from St. Paul to Thompson Junction, and one-half interest in 24 miles, from Thompson to Duluth. Purchased for \$500,000 by a committee for account of the bondholders.
Clover Hill, at Richmond, Va., April 26, including 14 miles of road from Clover Hill, Va., to the Richmond & Petersburg road, and a considerable coal property. Purchased for \$45,200 by John W. Johnston for the bondholders.

Illinois Midland.

To get to its terminus in Peoria this road uses six miles of the Toledo, Peoria & Warsaw track, the rental for which has

been very irregularly paid until it was nearly \$20,000 in arrears. On May 1 the Toledo road broke the connection at Farmdale and refused to allow any further use of its track until the rent was paid up. The Receiver of the Illinois Midland tried to run trains in over the Chicago, Pekin & Southwestern track, but that company also uses a part of the Toledo, Peoria & Warsaw track and the arrangement was stopped. Finally the Receiver of the Illinois Midland paid a part of the amount due and gave security for the rest, and the connection was restored.

Georgia Railroad Bonds.

The people of Georgia voted on May 1, by a very large majority on a light vote, to ratify the amendment to the State constitution prohibiting the payment of what are known as the Bullock bonds, including the direct State bonds and the indorsed bonds issued in aid of the Brunswick & Albany, the Cherokee, the Cartersville & Van Wert, and the Bainbridge, Cuthbert & Columbus roads, and some other bonds.

At a meeting held in Philadelphia last week at which representatives of this company, the Lehigh Valley, the North Pennsylvania, the Philadelphia & Reading and the Dominion Steamship Line were present, arrangements were completed for the billing through of Western freight to Europe by way of Philadelphia. Arrangements were also perfected for the shipment of an increased amount of grain to Philadelphia by the Erie & Lehigh Valley Line.

Arkansas Railroad Bonds.

The Arkansas Circuit Court at Little Rock has decided that the railroad act passed by the Legislature of 1869, under which about \$6,000,000 in bonds were issued to various railroads, was unconstitutional and the bonds illegal and void. An appeal is to be taken to the Supreme Court. As the State does not pay interest on these bonds, and shows no signs of doing so whether declared valid or not, the decision is perhaps not so much to be regretted.

Pittsburgh, Titusville & Buffalo.

It appears that the tearing up of the tracks of the Union & Titusville Branch was so far completed before the injunction was served as to remove nearly all of the third or 6 ft. gauge rail which was originally laid to give the Atlantic & Great Western a connection with Titusville. The removal of this rail appears to have been the chief object of the company, and this was secured. The injunction sued out by the condholders to prevent the further removal of the rails has been continued, and it is thought that the Court will order the third rail to be replaced.

Illinois Tax Cases.

The Receivers of the Toledo, Peoria & Warsaw, the Indianapolis, Bloomington & Western and the Peoria & Rock Island have each sued out a temporary injunction restraining the county tax-collectors from taking measures to collect the taxes due from those roads for 1873, 1874 and 1875.

St. Louis, Iron Mountain & Southern.

It is stated that the coupons due May 1 were not paid, but holders who presented them for payment received the following brief circular:

"Owing to the application of the Union Trust Company, at the instigation of Baring Bros. & Co., for an injunction and receiver, this company is prevented from paying the coupons falling due May 1, until said application is disposed of."

Missouri Pacific.

In the United States Circuit Court at St. Louis last week the Receivers lately in charge of this road filed their final statement. The Court directed an order to be entered discharging them from the trust upon transfer of any money or property still in their hands to the new company.

The Receivers state the earnings of the road from March 8, 1876, to April 20, 1877, as follows:

Freight.....	\$1,458,639 38
Passengers.....	624,766 77
Express, mail, etc.....	140,366 61
Missouri River R. R.....	66,089 65
Leavenworth, Atchison & Northwestern R. R.....	46,812 69
Boonville Branch.....	14,903 67
Lexington Branch.....	52,966 15
Total earnings.....	\$2,404,444 82
Working expenses.....	\$1,397,218 11
Mo. River R. R.....	46,925 72
L. A. & N. W. R. R.....	56,021 30
Boonville Branch.....	17,684 59
Lexington Branch.....	55,624 84
	1,573,474 56

Net earnings..... \$830,970 26
From this it appears that the Missouri River road (Kansas City to Leavenworth) was the only leased road which earned more than its expenses.

Illinois Central.

The Land Department reports for April sales of 560 acres of land for \$5,080. Cash collections on land contracts amounted to \$8,287.13.

The Traffic Department reports the earnings of the 707 miles of road in Illinois as follows: 1877, \$347,410.59; 1876, \$402,284.13; decrease, \$54,873.54, or 13.6 per cent. The earnings were \$491 per mile in 1877 and \$569 per mile in 1876.

The Court has finally decided that this company has a right to only two tracks on the levee at Cairo; that the side tracks above Eighteenth street in that city and the company's warehouse and elevator are nuisances and must be removed, and that the standing and loading of cars on the levee must be stopped. This decision, if enforced, will subject the company to some inconvenience, but it is believed that an arrangement can be made with the City Council which will prevent trouble.

St. Louis, Keokuk & Northwestern.

On May 3 the Wabash Company tore up the track of this road where it crossed and connected with its own track at Hannibal, Mo., afterwards piling up obstructions and stationing a number of men to prevent the replacing of the track. The avowed reason for this course was the failure of the St. Louis, Keokuk & Northwestern to pay rent due for the use of the Wabash track; the real reason is said to have been that the Chicago, Burlington & Quincy had made an arrangement with the St. Louis, Keokuk & Northwestern to send its business from Hannibal over the Keokuk road to Quincy, crossing its freight trains there and avoiding the use of the Hannibal bridge.

On the following day the St. Louis, Keokuk & Northwestern Company obtained an injunction restraining the Wabash from further breaking the connection. The crossing and switches were then replaced and all obstructions removed. Argument was to be heard this week on the question of making the injunction perpetual.

Dividends.

Dividends have been declared as follows:
Cleveland & Pittsburgh, 1 1/2 per cent., quarterly, on the new guaranteed stock, payable June 1.
Boston & Maine, 2 per cent., semi-annual, payable May 15.
Pennsylvania, 1 1/2 per cent., quarterly, payable May 25.

Western, of Minnesota.

This company, originally organized in 1875, has been reorganized for the purpose of completing the Brainerd Branch of the St. Paul & Pacific. The late Legislature of Minnesota passed a law providing for the conveyance of the graded road-bed of the Brainerd Branch and the land grant to any corpora-

tion which would complete the line, provided the St. Paul & Pacific failed to accept the provisions of the law by May 1. It failed to do so, and the Western Company has now given notice of its intention to build and has deposited \$15,000 as security, in accordance with the law. The distance to be built, from Watab to Brainerd, is 61 miles, of which 57 miles were graded in 1872, and to secure the grant it must be finished within a year. The stock of the Western Company is \$400,000, and a controlling interest is held by parties interested in the Northern Pacific.

St. Paul & Pacific.

The St. Paul *Pioneer-Press* says that work is to be begun very soon on the cut-off line which is to connect the finished section of the St. Vincent Extension (from Glyndon northward down the Red River valley) with the First Division near Breckenridge. This requires the building of about 85 miles of road, most of it very light work.

Manchester & Keene.

This company has resolved to resume work on the road and has put a small force at work on the grading between Greenfield, N. H., and Bennington.

Des Moines & Minnesota.

Nearly all the towns on the line have voted a tax in aid of an extension of this road from Ames, Ia., northward into Hamilton County.

Delaware & Hudson Canal.

At the annual meeting in New York, May 8, President Dickson answered a great many questions put by stockholders as to the company's condition and property in a manner apparently satisfactory, for resolutions were passed expressing confidence in the management. A committee of five was appointed to inspect personally the coal and railroad property of the company and report thereon to the stockholders.

Kansas Pacific.

A dispatch from Leavenworth, Kan., dated May 3, says: "The Kansas Central Railroad Company to-day obtained an injunction against the Kansas Pacific Railroad Company restraining the latter road from the election of officers, which was to have taken place to-day in Lawrence, Kan. The plaintiffs claim that \$250,000 of stock in the Kansas Pacific Railroad, issued to the county of Leavenworth and by the county assigned to the Kansas Central, is the only legitimate stock ever issued, and the injunction commands the road to account for all lands, bonds and other property received for the construction of the road."

Central Vermont.

The report that this company would require its engineers to leave the Brotherhood or take any action in that direction is denied by authority.

Chicago & Northwestern.

This company is now running between Chicago and Council Bluffs the new Pullman hotel cars which have been for some time in process of construction for this line. These cars are very complete and handsomely fitted up; they differ from the ordinary dining-car, being a Pullman sleeping or saloon car, with the addition of a well-furnished kitchen and larder, from which meals can be furnished to the passengers as they may desire and from a liberal bill of fare. The new cars are said to be much approved by passengers.

Lafayette, Muncie & Bloomington.

The blockade of this road at Lafayette, Ind., by the attempt of the trustee to take forcible possession of the Western Division was broken May 2. The trustee made application on that day to the United States District Court for the appointment of a temporary receiver in their interest. On a statement of the facts the Court promptly made an order overruling all injunctions granted by the State courts, directing the removal of all obstructions and ordering that the company be restored to all its rights pending the hearing on the application for a receiver, which was set for May 10. The road was promptly cleared and traffic resumed.

The company has brought suit against the Trustee, A. B. Baylis, and his bondsmen to recover \$105,000 damages resulting from the attempt to seize the Western Division, and the consequent stoppage and delay to the business of the road.

The suit of the company to restrain the Cincinnati, Lafayette & Chicago from using its track from Templeton to Lafayette to convey traffic coming from the Toledo, Peoria & Warsaw to the Wabash road at Lafayette, came up in the Superior Court at Lafayette May 4, when affidavits were submitted and the hearing of arguments set for May 7.

The case has been further complicated by an attempt of the Lafayette, Bloomington & Mississippi Company to resume possession of its road, which is an extension westward of the Lafayette, Muncie & Bloomington and was leased to that company not long since. This also has gone to the courts.

Meetings.

Meetings will be held as follows:

Kentucky Central, annual meeting, at the office in Covington, Ky., May 22, at 11 a. m.

Chicago, Milwaukee & St. Paul, annual meeting, at the office in Milwaukee, Wis., June 8, at noon. Transfer books close May 22.

Illinois Central, annual meeting, at the office in Chicago, May 30, at 1 p. m.

Denver & Rio Grande.

The Auditor's report for February is as follows, including the whole road:

Freight earnings.....	\$28,515 80
Passengers, mail and express.....	11,241 64
Miscellaneous.....	424 30

Total (\$149 per mile).....	\$40,181 74
Expenses (61.59 per cent.).....	24,746 57

Net earnings (\$87 per mile)..... \$15,435 17

Of the earnings, \$1,876.31 were from mails and other Government business. The mileage worked is 269 miles, of which 206 miles are main line and 63 miles branches.

North Wisconsin.

During last winter the right of way was cleared for 20 miles northward from the present terminus at Clayton, Wis., and work has now been begun on the grading. Contracts have been let for the first 10 miles, to be ready for the rails by Aug. 1, and a considerable force is now employed.

Cincinnati, Sandusky & Cleveland.

The trouble on this road appears likely to bring about a war of jurisdiction between courts. The Sloane party having again gone before Judge Finnetrock, of the Sandusky County Court of Common Pleas, the judge who originally appointed the Receiver, he decided to vacate the order vacating the receivership made by the court at Toledo.

Subsequently some of the bondholders filed a petition in the United States Circuit Court at Cleveland representing that their interests were in danger, owing to the condition of affairs, and asking that the court appoint a receiver to take charge of the property.

A meeting of security holders was held in Boston, May 4, when President Farlow made an address setting forth the manner in which Sloane had secured possession of the property and denouncing him in very bitter terms. He further stated

that seven-eighths of the securities were held in Massachusetts. A petition asking the United States Circuit Court to appoint Mr. Farlow Receiver in the suit begun by the bondholders was signed by nearly all of those present.

Atchison, Topeka & Santa Fe.

This company's report for March is as follows:

Freight earnings.....	\$126,908 80
Passenger.....	55,004 86
Mail, express, etc.....	7,216 78

Total (\$266 per mile).....	\$189,129 94
Expenses (51.77 per cent.).....	97,904 80

Net earnings (\$128 per mile)..... \$91,225 14

As compared with March, 1876, there was an increase of \$8,883.42, or 4.9 per cent., in gross, and a decrease of \$3,441.03, or 3.6 per cent., in net earnings. For the three months ending March 31 the road earned \$460,343.69 gross, and \$191,099.12 net, expenses being 58.5 per cent. of gross earnings.

Yamhill & Tillamook.

A company has been formed to build a narrow-gauge road from McMinnville, Oregon, on the Yamhill River, westward to some convenient point on tide-water in Tillamook County.

Portland, Saco & Portsmouth.

At a special meeting held in Kittery, Me., May 7, the stockholders voted to ratify a supplementary agreement with the Eastern Company, by which a mortgage is to be put on the road to secure the payment of \$250,000. The Eastern Company assumes the payment of the interest and principal, one-eighth of the principal to be paid at the end of each half-year. It was also voted to continue the existing rental of 6 per cent. on the stock from the Eastern Company.

Lehigh Valley.

Reports are current that this company is preparing to follow the example of the Reading and require its engineers to leave the Brotherhood. The officers are said to be preparing a plan for a life insurance fund for the employees of the road.

Southern Pacific.

Messrs. D. O. Mills and Lloyd Tavis, trustees, give notice that they will receive until May 23, at their office, Fourth and Townsend streets, San Francisco, proposals for the sale to them of mortgage bonds of this company to the amount of \$200,000, gold, for the sinking fund.

Rochester & State Line.

Work has again been resumed and its active prosecution is promised. If no more legal troubles arise to prevent it is expected that the road will be finished in the contract time.

It is stated that the company has concluded an agreement with the Erie as to the crossing of the two roads at Leroy.

Toledo, Peoria & Warsaw.

There has been some talk of removing the offices from Burlington, Ia., and abandoning the Burlington Branch, which grew out of trouble relating to the depot property in Burlington and several suits commenced against the road there. The matter, however, has since been settled and no change will be made.

Eastern.

Last week the Massachusetts Bank began suit to recover on a note for \$60,000, and had attachments put on the property of the company at all the stations on the Portsmouth, Great Falls & Conway Division in New Hampshire and trustee processes served on all the station agents.

Ohio & Mississippi.

A telegram from St. Louis says that the Receiver will shortly pay a second 25 per cent. on the supply bills outstanding at the time of his appointment. The payments will be made about May 15.

Texas Western.

Work has been temporarily stopped on this road, and there appears to have been some trouble about the payment of the men engaged in construction. This was finally settled, however, and most of the men were paid off and discharged.

Hamilton & Northwestern.

At the annual meeting in Hamilton, Ont., May 1, the President reported that arrangement had been made to extend the Lake Erie Division from Jarvis to Port Dover, 10 miles, this year. The Northwestern Division was opened in February from Hamilton to Georgetown, 36 miles, and 29 miles more, from Georgetown to Barrie, are under contract to be finished this year. Work is soon to be begun between Clarksonville and Glencairn.

Louisville, Paducah & Southwestern.

The final report of Receiver Du Pont states that the gross earnings for the period of the receivership, May 22, 1875, to April 21, 1877, were \$771,762; net, \$100,390. The Receiver's balance at the close of the term was \$26,133, the rest of the net earnings having been applied to payment of claims. The floating debt of the old company was \$597,821, of which \$470,079 was in bills payable and current accounts, the rest in wages, contractors' accounts and similar claims.

Washington & Ohio.

It is said that a proposition for the extension of this road from Round Hill to Winchester, Va., is to be submitted to the stockholders at the annual meeting this month.

Atlantic & North Carolina.

The North Carolina Circuit Court has denied the motion to set aside the appointment of Receiver Hughes and to return the road to the company. It also denied a second motion to remove the Receiver and appoint a new receiver in the Craven County suit to enjoin the payment of interest on the bonds.

Central, of New Jersey.

The up-town ferry, from Jersey City to Clarkson street, New York, was discontinued May 10. It was established not long since and was a great convenience to the suburban travel over the road, but it is said that it has not so far paid expenses and the Receiver probably did not feel justified in continuing to run it.

In the suit of the Lehigh Coal & Navigation Company the United States Circuit Court on May 4 made an order remanding the case to the Court of Chancery of New Jersey. It is said, however, that this order does not affect the petition for the surrender of the Lehigh & Susquehanna road in default of payment of rental, which is still undecided.

St. Paul & Pacific.

Mr. John S. Kennedy, Trustee, gives notice that he will pay, on presentation at the office of J. S. Kennedy & Co., No. 41 Cedar street, New York, the coupon due June 1, 1873, on the \$1,200,000 issue of bonds and \$12 upon the coupon due May 1, 1873, on the \$6,000,000 issue of the First Division, St. Paul & Pacific Company.

Chesapeake & Ohio.

The United States Supreme Court, on appeal, has confirmed the decision of the Virginia Court of Appeals, holding that the property of the company is not exempted from taxation except as held by that Court. By this decision all the line east of Covington and a proportionate part of the equipment is subject to taxation. By the law of 1853 the property of the Covington & Ohio Company was exempted from all taxes until the

net earnings should reach 10 per cent. on the stock. The company claimed that by the consolidation of the Covington & Ohio with the Virginia Central the exemption was extended to all the property of the consolidated company; this claim is now finally disallowed. There are only about 10 miles of the road in Virginia west of Covington.

Louisville, Cincinnati & Lexington.

The Kentucky Court of Appeals having sustained the decree of foreclosure and returned the case to the Chancery Court, a final order was entered in that court, April 26, directing the sale of the road after four months' public notice.

Poughkeepsie Bridge.

The second caisson for this bridge was launched May 4 and work begun on the third. An increased force has been put on by the contractors.

Chicago & Southern.

In addition to the Receiver appointed on petition of the bondholders by the United States Circuit Court, the State Courts have appointed James Walsh Receiver in a suit for debt.

Chicago, Clinton & Western.

Trains are now running regularly on the nine miles of road completed last year by the Receiver, from Iowa City, Ia., northeast to Elmira, at the crossing of the Burlington, Cedar Rapids & Northern road.

Syracuse & Chenango.

The name assumed by the new company organized by the purchasers of this road at the recent sale is Syracuse, Chenango & New York, and not Chenango Valley as at first incorrectly reported.

Glencoe, Pinconning & Lake Shore.

This road is now open for traffic from Glencoe, Mich., through Pinconning and Pine Grove to Lake, on the west shore of Saginaw Bay in Bay County. The road is 14 miles long and part of it, built as a lumber road and with wooden rails, has been in operation some time.

Chicago & Lake Huron.

The round-house and machine shops at Battle Creek, Mich., caught fire on May 5 and were entirely destroyed, in spite of the efforts of the employees. Two locomotives, a tender, a stationary engine, a number of tools and some unfinished work were destroyed with the buildings. The loss is estimated at about \$30,000, on which there was no insurance.

Maine Central.

In the case of Sullivan, Trustee, against the Portland & Kennebec Company, the United States Supreme Court has finally affirmed the decision of the Circuit Court.

Quincy, Payson & Southeastern.

A company by this name has been organized to build a narrow-gauge road from Quincy, Ill., southeast through Payson to Pittsfield and thence east by south through Effingham to the Wabash River, the distance being about 230 miles. The capital stock is to be \$25,000 per mile.

Henderson & Overton.

This road was formally opened for traffic April 22. It extends from Overton, on the International & Great Northern, southeast to Henderson, Tex., 16 miles.

Raleigh & Augusta Air Line.

The 11 miles remaining to complete this road to the crossing of the Carolina Central at Hamlet, N. C., are all graded with the ties in place. It is said that the iron will be laid soon.

Freehold & Keyport.

The parties who bought this unfinished road (formerly the Monmouth County Agricultural) announce that they are making arrangements to begin work, and expect to have the line in operation this summer. It is to extend from Freehold, N. J., to Keyport, about 16 miles.

Boston & Lowell.

This company, having secured the necessary permission from the city authorities, will begin work very soon on an extension of its Lawrence Branch from South Lawrence to North Lawrence, Mass., a little over a mile. A new bridge over the Merrimack is required.

Camden & Atlantic.

This company will run this summer a fast express, making the 60 miles from Camden to Atlantic City in 90 minutes. No stop is made on the road. This train is now running on Saturday and Monday only, but will be run daily after June 1.

Washington, Cincinnati & St. Louis.

This company has completed the grading of 22 miles of road from Harriburg, Va., to the coal fields in Rockingham County, and is now negotiating for 1,200 tons of iron rails (35 lbs. per yard) and fastenings. The terms offered are understood to be 25 per cent. cash and the balance in 6 per cent. first-mortgage bonds.

Gulf, Colorado & Santa Fe.

The stockholders have voted to ratify the action taken by the directors to secure an extension of the road, and to give the board all requisite authority to contract for that extension.

Dorchester & Delaware.

It is proposed to build a branch leaving this road near Cambridge, Md., and running south through Lakeville to Bishop's Head, 22 miles. Dorchester County has voted \$75,000, leaving about \$25,000 to be raised by stock subscriptions. The branch is expected to secure some local business and a large traffic in oysters and fish.

Arkansas Central.

The foreclosure sale of this road is advertised to take place June 8.

Norwich & Worcester.

The \$400,000 bonds of the new mortgage loan were awarded to the banking house of George Wm. Ballou & Co., of New York and Boston, at a price not stated.

ANNUAL REPORTS.

Lake Shore & Michigan Southern.

The Vice-President's report for the year ending Dec. 31, 1876, makes the following statements:

"The number of miles of road operated in 1876 was 1,176.79, being 1.40 miles more than in 1875. There are 540.37 miles of road in the Main Line (Buffalo, N. Y., to Chicago, Ill.), and 636.42 miles of road in eleven branches and tributary leased roads. Of the 1,176.79 miles road operated, this company owns 1,024.71 miles (although 160.11 miles are embraced in three other organizations), and leases 152.08 miles.

"Of the 540.37 miles of Main Line, 235.65 miles are double track (an increase of 4.85 miles in 1876), making the Main Line equal to 776.02 miles of single track; and two branches—203.66 miles—are so situated that they, with the Main Line, form a double line of road between Cleveland, Ohio, and Elkhart, Indiana (101 miles east of Chicago), making together 979.68 miles of track, of which 718 miles (73 per cent.) are laid with steel rails. During the year 1876, 10,560 tons—112 miles—steel

The capital stock and funded debt are:

Stock (\$27,233 per mile).....	\$21,405,000
Union Pacific, South-rn Branch bonds.....	\$2,549,000
Tobacco and Necocho bonds.....	349,000
Missouri, Kan. & Texas consolidated bonds.....	14,752,000
Hannibal & Central Missouri bonds.....	800,000

Total bonds (\$23,600 per mile)..... 18,580,000
Second-mortgage income bonds issued and to be issued under agreement of March 1, 1876 (\$7,888 per mile)..... 6,200,000

Total (\$35,721 per mile)..... \$46,185,000

The income bonds issued under agreement are for the purpose of funding certain coupons and parts of coupons and in settlement of floating debt. Under the agreement only 4 per cent. is paid this year on the consolidated and Southern Branch bonds, and the interest charge for the present year will be \$776,998, gold. Interest on the income bonds will not be payable unless earned. This agreement has been assented to by holders of all but 658 bonds.

The work done was as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Train mileage, passenger.....	736,183	748,525	Dec..	12,342 1.6
Train mileage, freight.....	1,229,970	1,011,714	Inc..	218,256 21.6
Train mileage, service and switching.....	416,330	319,939	Inc..	96,391 30.1
Total.....	2,382,483	2,080,178	Inc..	302,305 14.5
Passengers carried.....	210,824	175,885	Inc..	34,939 20.0
Passenger mileage.....	23,937,440	17,820,359	Inc..	6,117,081 34.3
Tons freight carried.....	440,848	329,896	Inc..	110,952 33.6
Tonnage mileage.....	105,110,714	82,877,034	Inc..	22,233,680 26.8
Average pass. train load No.....	32.52	23.81	Inc..	8.71 35.6
Average freight train load, tons.....	85.46	81.92	Inc..	3.54 4.3
Gross earn. per freight train mile.....	\$1.5286			
Net earn. per freight train mile.....	0.6641			
Gross earn. per pass. train mile.....	0.9700			
Net earn. per pass. train mile.....	0.2564			
Receipt per pass. per mile.....	3.420 cts.	4.210 cts.	Dec..	0.790 ct. 18.8
Receipt per ton per mile.....	2.089 "	2.359 "	Dec..	0.270 " 11.4

The earnings for the year were:

	1876.	1875.	Inc. or Dec.	P. c.
Freight.....	\$2,196,432 15	\$1,955,115 18	Inc..	\$241,316 97 12.3
Passengers.....	819,487 39	750,977 41	Inc..	68,509 98 9.1
Mail.....	122,669 41	132,351 33	Dec..	9,681 92 7.3
Express.....	54,775 00	62,447 35	Dec..	7,672 35 12.3
Miscellaneous.....	29,914 49	4,034 01	Inc..	19,880 48 497.0
Total.....	\$3,217,278 44	\$2,904,925 28	Inc..	\$312,353 16 10.8
Expenses and renewals.....	1,845,394 93	1,544,821 37	Inc..	300,573 56 19.5
Improvements.....	37,007 75	18,582 79	Inc..	18,424 96 102.3
Total.....	\$1,883,002 68	\$1,563,404 16	Inc..	\$319,598 52 20.4
Net earnings.....	\$1,334,275 76	\$1,341,521 12	Dec..	\$7,245 36 0.5
Gross earn. per mile.....	4.093 22	3.997 00	Inc..	96 23 10.8
Net earn. per mile.....	1.697 55	1.707 00	Dec..	0.45 0.5
Per cent. of expenses.....	57.35	53.17	Inc..	4.18 7.9
Per cent. of expenses and improvements.....	58.53	53.82	Inc..	4.71 8.8

The statements include only such earnings as produce a money result in the accounts.

The general account of the Receiver for the six months from Jan. 1 to June 30 was as follows:

Balance from previous year.....	\$685,821 61
Net earnings, less taxes paid (\$74,509.89).....	630,472 45
Land Department.....	54,610 23
M. & T. Ry. Co. accounts.....	20,024 12
Total.....	\$1,290,928 41
Paid on account Boonville Bridge.....	\$175,232 49
" " M. & T. Ry. Co.....	63,497 27
" " coupons.....	8,416 83
" " expenses and allowances in suits.....	164,261 28
Land Department.....	56,756 37
Union Trust Co., general account.....	603,298 73
Materials and supplies transferred to Trustee.....	180,917 68
Balance, unsettled accounts.....	8,546 79
Total.....	\$1,222,173 23

The Trustee's general account for the six months from July 1 to Dec. 31 is as follows:

Net earnings, less taxes paid (\$74,509.89).....	\$685,821 61
Land Department.....	41,336 70
Liabilities, pay-rolls, supplies, etc.....	495 259 43
Total.....	\$1,222,173 23
Land Department.....	\$75,428 93
Equipment, paid for 200 box-cars.....	108,251 79
North Texas Compress Co.....	22,037 50
Unadjusted expenses.....	16,836 21
Cash remitted to New York (Union Trust Co.).....	349,000 00
Total.....	\$753,554 43

Balance..... \$648,618 80

Of this balance \$135,670.06 is in cash and supplies on hand, the rest in accounts and balances due.

The Land Department reports sales of 52,831 acres for \$131,693.47, the larger part paid for in bonds of the company. There are 340,959 acres of land-grant unsold, besides about 100,000 acres in dispute with the Kansas Pacific and others and the 178,811 acres embraced in the Owsage ceded lands.

During the year 300 box cars were bought and 100 leased, and arrangements have been made to purchase 10 new engines through an equipment trust. There were used in renewals 93 tons of steel and 2,499 tons rolled iron rails and 302,336 ties. Much work was done in renewing and repairing bridges and filling in trestles. A large amount of this work is required during the current year. The expenses were increased by heavy repairs in consequence of wash-outs and destruction of smaller bridges, and the very serious loss of the Red River bridge. Good progress has been made on the permanent bridge to replace the present temporary structure at Red River, but the work is expensive and necessarily slow.

The earnings of the Boonville Bridge (kept separately) were \$97,888.51; expenses and taxes, \$10,197.14, leaving a balance of \$87,691.37 to apply to interest.

Western Union.

This company owns a line from Lake Michigan at Racine, Wis., southwestward to Rock Island, Ill., 212.75 miles. It is controlled by the Chicago, Milwaukee & St. Paul, which owns a majority of the stock. The present report is for the year ending Dec. 31, 1876. The equipment consists of 39 locomotives; 10 passenger, 2 sleeping and 12 baggage, mail, express and second-class cars; 389 box and caboose, 60 stock, 50 flat and 82 coal cars; 1 business, 1 derrick and 2 pile-driver cars.

The credit side of the general account is as follows:

Stock (\$15,800 per mile).....	\$4,000,000 00
Bonds (\$16,400 per mile).....	3,500,000 00
Current accounts and balances.....	310,629 82
Income account.....	364,117 59
Total (\$35,142 per mile).....	\$8,114,747 41

The work done for the year was as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Train mileage, passenger.....	280,974	237,721	Inc..	43,253 18.2
Train mileage, freight.....	433,267	484,275	Dec..	51,011 10.5
Train mileage, service.....	19,045	32,620	Dec..	13,575 41.6
Total.....	733,286	754,619	Dec..	21,333 2.8
Passengers carried.....	249,957	216,390	Inc..	33,567 15.5
Passenger mileage.....	6,308,121	5,819,042	Inc..	489,079 8.4
Tons freight carried.....	434,584	451,868	Dec..	17,284 3.9
Tonnage mileage.....	44,026,192	50,756,843	Dec..	6,730,651 13.3
Average pass. train load, No. cars.....	22.45	24.48	Dec..	2.03 8.9
Average freight train load, tons.....	101.61	104.81	Dec..	3.20 3.1
Ear'g per pass. tr'n mile.....	\$0.91	\$1.08		
Ear'g per freight tr'n mile.....	1.50	1.50		
Expenses per train mile.....	1.12	1.15	Dec..	0.03 2.6
Receipt per pass. per mile.....	3.57 cts.	3.48 cts.	Inc..	0.09 ct. 2.6
Receipt per ton per mile.....	1.77 "	1.70 "	Dec..	0.07 " 1.1

Of the tonnage mileage 58.5 per cent. was of east-bound freight. The cost of locomotive service per mile was 26.99 cents.

The earnings for the year were:

	1876.	1875.	Inc. or Dec.	P. c.
Freight.....	\$778,483 61	\$910,045 30	Dec..	\$131,561 69 14.5
Passengers.....	225,098 53	202,343 11	Inc..	22,755 42 11.2
Mails, exp's, etc.....	44,385 26	48,041 60	Dec..	3,656 34 7.7
Total.....	\$1,047,915 40	\$1,160,430 01	Dec..	\$112,514 61 9.7
Expenses.....	792,369 42	830,287 58	Dec..	37,918 11 3.7
Net earnings.....	\$255,545 98	\$330,142 43	Dec..	\$74,596 50 24.7
Gross earnings.....	4,926 00	5,454 00	Dec..	528 00 9.7
Net earn. per mile.....	1,168 00	1,552 00	Dec..	384 00 24.7
Per cent. of exp's.....	76.0	71.6	Inc..	4.5 6.3

The expenditures not charged to operating account were:

Equipment (25 flat cars).....	\$6,875 00
Steamer Wm. Osborn.....	3,500 00
Racine Warehouse & Dock Co., deficiency per contract.....	2,975 00
Interest and exchange.....	19,081 05
Interest on bonded debt.....	245,035 00
Total.....	\$282,356 28
Net earnings.....	\$248,545 98

Deficit for the year..... \$33,710 30

During the year 1 passenger, 10 box and 3 coal cars were rebuilt. There were used in renewal of track 1,351 tons new and 2,139 tons re-rolled iron rails and 68,045 new ties; four new bridges were built and a number of depots repaired and improved.

Great Western, of Canada.

The latest report of this company covers the half year ending Jan. 31, 1877. The road worked includes the Main Line from Windsor to Suspension Bridge, 229 miles; the Loop Line, from Glencoe to Suspension Bridge, 152 miles, and 115 miles of branches, 496 miles in all, of which 481 miles are owned, and

15 miles (of the Loop Line) leased. The company also works 238 1/2 miles of leased branches, the earnings of which are not stated.

There was a net increase of capital account during the half-year of \$354,551. There were \$7,602 bonds paid off, and on the other hand \$243,049 was added to capital for overdrafts on revenue account; \$54,881 for depreciation of revenue assets; \$21,658 for dividends on preferred stock funded; \$450 for arrears of call on shares, and \$2,115 on other accounts.

The earnings and expenses of the half-year, as compared with the corresponding half of last year, were:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Gross receipts.....	\$401,623	\$436,087	Dec..	\$34,464 13
Working expenses.....	313,715	309,507	Inc..	4,208 1.3
Net earnings.....	\$87,913	\$126,580	Dec..	\$38,667 30.3
Loss on leased lines, interest on bonds, debenture stock, etc.....	95,688	101,952	Dec..	6,264 6.1

Deficit or surplus..... \$7,775

Per cent. of working expenses..... 78.11

The result being a deficit of \$7,775 against a surplus of \$24,568 last year. Expressed in American currency the earnings for the half-year were \$4,332 gross, and \$926 net, per mile.

The amounts charged to revenue account and credited to the various renewal funds was \$25,848, making a net deficit of \$33,623. The decrease was mainly in through freight earnings and the unfavorable result of the half year is chargeable to the severe weather of the winter and chiefly to the very low rates on through business resulting from the trouble between the trunk lines. The business of the branches also suffered from the partial failure of crops and the general depression of business in Canada.

The earnings and working expenses per train mile for the last five half years were:

Half year ending.....	Earnings.....	Expenses.....	P. c.	Exp. and renewals.....	P. c.
Jan. 31, 1875.....	6 8 1/2	4 11 1/2	74.38	5 4	78.20
July 31, 1875.....	4 11 1/2	4 6	90.32	4 9 1/2	85.77
Jan. 31, 1876.....	5 7	3 11 1/2	70.99	4 4 1/2	77.70
July 31, 1876.....	4 10 1/2	3 6 1/2	73.63	4 0 1/2	88.94
Jan. 31, 1877.....	4 9	3 8 1/2	79.11	3 11 1/2	89.15

The balance of renewal funds Jan. 31 was \$181,880. From Aug. 1, 1876, the amount expended for repairs has been charged to revenue, the renewal funds being applied only to replacing equipment, etc., when entirely worn out or destroyed.

The agreement with the Detroit & Milwaukee bondholders (heretofore noted) has been concluded, subject to approval of the shareholders. An agreement is also submitted whereby the company acquires the 33 miles of the Brantford, Norfolk & Port Burwell road from Brantford to Tilsonburg, by the payment of \$10,000 and the guarantee of \$28,000 of 6 per cent. bonds. The report also refers to the incomplete negotiations for an agreement on competitive business with the Grand Trunk.

LOCOMOTIVE RETURNS, JANUARY, 1877.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

NAME OF ROAD.	Number of miles operated.	Number of Locomotives in service.	Mileage.		No. Miles run to		Average cost per freight car per mile, cents.	Cost per Mile in Cents for							Average cost per ton of freight hauled.
			Total.	Average per train.	Ton of Coal.	Cord of Wood.		Fuel of Oil.	Repairs.	Fuel.	Stores.	Miscellaneous.			
												Engine, train, and wages.	Other.		
Allegheny Valley.*	269	8	201,659	2,701	33.76		17.42	4.96	6.01	0.56	0.76	6.05 18.34	1.81	1.00	
Atlantic & Great Western (1st & 2d Divs.)	228	45	137,753	2,633	33.76		30.51	5.00	6.01	0.47	0.82	6.85 18.15	1.91	1.10	
" " (Third & Fourth Divs.)	88	54	100,760	1,866	33.76		20.44	4.09	6.01	0.45	0.58	5.95 17.08	1.91	2.09	
" " (Mahoning Division).	360	23	69,477	3,158		56.90	19.11	4.50	4.19	0.47		7.15 16.55		2.47	
Atlantic & Gulf.	187	11	28,945	2,631	34.30		12.30	4.00	4.48	0.49		5.70 14.67	1.54		
Cairo & Vincennes.	148	14	97,255	2,661	32.02	50.00	21.28	2.83	14.83	0.57	0.28	7.36 25.67	8.00	4.00	
Canada & Atlantic.	67	17	17,010	1,418	62.50		12.25	5.54	6.89	0.85		5.94 18.61			
Central Pacific (Western Division)†.	202	83	122,900	2,320	42.87		17.03	12.59	17.62	0.66	0.56	8.76 19.96	7.90	5.00	
" " (Visalia Division)†.	187	14	35,511	2,731	58.80		17.24	12.10	12.75	0.63	0.08	7.15 32.71	7.30	4.00	
" " (Fulcrum Division)†.	181	12	32,507	2,717	39.69		12.34	2.25	18.90	0.99	0.19	7.81 30.04	7.90	5.00	
" " (Los Angeles, Yuma, San Diego and Wilcox Divs.)†.	273	15	43,490	2,907	52.10		11.61	3.57	14.40	0.90	0.16	7.31 26.37	7.50	5.00	
" " (Sacramento Division)†.	120	41	84,725	2,066		29.35	14.13	10.74	17.03	0.76	0.40	9.23 38.16		4.00	
" " (Oregon Division)†.	151	8	21,522	2,690		41.31	25.35	5.70	12.10	0.46	0.27	8.33 26.86		4.00	
" " (Truckee Division)†.	203	29	71,814	2,476	34.56	29.10	16.27	4.93	19.64	0.61	0.56	8.47 34.21	7.50	5.00	
" " (Humboldt Division)†.	201	21	51,748	2,464	42.83		15.03	10.89	17.51	0.71	0.49	7.72 37.32	7.80	4.00	
" " (Salt Lake Division)†.	219	27	78,099	2,893	34.79		13.50	3.72	21.55	0.82	0.56	7.19 32.85	7.50	5.00	
Cleve., Col., Cin. & Ind. (Columbus Div.)†.	187	14	14,430	2,622	42.36	55.32	29.04	3.53	4.63	0.61	0.96	5.84 15.69	1.75	1.00	
" " (Indianapolis Div.)†.	207	64	152,775	2,343	41.87	46.38	22.47	5.05	5.02	0.65	1.72	5.50 18.04	1.75	1.00	
" " (Cincinnati Div.)†.	130	34	81,972	2,411	35.87		22.63	5.36	5.28	0.62	0.94	6.22 18.42	1.75	1.00	
Cleveland & Mahoning Valley.	41	6	14,692	2,449	28.03		22.20	1.77	6.67	0.32	1.16	6.08 16.00	1.75	1.00	
Cleveland & Pittsburgh*.	199	72	151,711	2,100	41.28		18.03	4.29	3.24	0.66	3.12	7.09 18.91	1.17	3.00	
Del., Lacka. & West. (Bloomington Div.)†.	90	25	53,600	2,144		31.45		3.74		0.76		5.94 10.44			
Erie & Pittsburgh*.	98	29	54,514	1,880	32.28		16.10	2.70	5.82	0.72	2.68	7.03 18.81	1.89	2.00	
Hannibal & St. Joseph.	296		129,797		32.60		21.10	4.86	3.38	0.38		6.82 14.84	3.00	2.00	
Illinois Central (Chicago Div.)†.	253	88	152,749	2,634	33.35		14.36	5.39	6.01	0.33		6.13 17.98	1.90	4.00	
" " (South Div.)†.	231	36	89,138	2,188	32.42		12.92	6.01	5.98	0.35		5.94 12.98	1.90	4.00	
" " (North Div.)†.	225	50	86,265	1,684	29.48		10.91	7.62	6.87	0.43		6.08 20.80			
" " (Iowa Div.)†.	401	56	37,649	1,744	26.03		12.78	5.95	10.33	0.39		6.28 23.48	2.75	4.70	
Jeffersonville, Madison & Indianapolis*.	226	40	89,449	2,236	39.60	39.16	14.43	3.36	7.49	0.53	2.90	6.28 23.48	2.88	2.40	
Kansas Pacific and based lines†.	197	44	176,084	2,579	25.11		12.97	4.29	12.12	0.46		6.99 24.23	3.12	3.03	
Kansas City, St. Jo. & Council Bluffs.	275	28	72,192	2,378	48.90		25.90	4.20	7.60	0.50		6.90 18.60	3.00	2.00	
Lake Shore & Mich. So. (Buff. Div.)†.	90	90	179,741	1,997	37.84	39.16		4.42	8.38	0.57		6.62 19.91	3.05	1.60	
" " (Erie Div.)†.	113	239	656,210	2,330	39.97	61.47		5.06	8.56	0.46		6.19 20.21	2.67	1.45	
" " (Toledo Div.)†.	85	137	391,911	1,616	31.00	50.83		5.26	10.31	0.34		6.38 22.23	3.12	4.00	
" " (Mich. So. Div.)†.	207	409	990,191	1,951	33.55	49.58		5.51	10.31	0.38		6.51 22.61	3.05	1.25	
Little Rock, Mississippi River & Texas.	100	4	7,599	1,900		66.30	18.50	7.33	3.98	0.39	2.89	10.17 24.76		2.00	
Louis. & Nash. (First Div., Main Stem)†.	285		109,892		26.75	35.70	12.67	4.27	9.03	0.48	1.82	7.22 22.97		2.00	
" " (Second Div.)†.	200		79,890		27.00		10.08	3.97	8.79	0.61	2.63	6.96 22.30	0.09	1.00	
" " (Memphis Div.)†.	131		42,511		38.26		12.40	5.74	13.25	0.54		6.29 22.10	0.13	0.30	
" " (Nash. & Dec. Div.)†.	122		46,792		27.75	96.00	13.45	4.51	10.15	0.61	2.79	6.37 24.44	0.16	0.70	
" " (S. & N. A. R.R.)†.	153		77,813		25.75	69.42	17.47	3.34	8.41	0.68	1.22	6.12 20.77	0.09	0.20	
Missouri, Kansas & Texas*†.	786	70	306,098	2,953	28.18		10.20	4.84	7.89	0.59		6.13 19.45	2.39		
North'n Cent'l (Elm. & Canada) gas Div.	147	45	90,332	2,012	22.68		17.24	6.14	8.09	0.76		6.48 21.47	0.07	0.60	
Pennsylvania (New York Division)†.	120	129	312,340	2,421	26.99		9.65	6.20	10.60	1.10		17.90 13.21			
" " (Amboy Division)†.	154	47	92,112	1,960	45.50		13.93	4.00	6.30	0.80		11.00			
" " (Belvidere Division)†.	103	35	59,261	1,693	32.01		11.21	8.50	9.90	1.10		10.00			
" " (Philadelphia Division)†.	191	169	488,244	2,583	25.85		12.02	2.20	5.00	0.90		10.80			
" " (Middle Division)†.	122	112	370,135	2,365	23.85		15.85	4.50	5.30	0.70		10.60			
" " (Pittsburgh Div., E. End)†.	182	84	189,746	2,399	19.93		8.93	8.50	6.40	1.10		10.60			
" " (Pittsburgh Div., West End)†.	124	125	380,949	1,750	26.90		12.11	6.40	5.60	0.90		11.90			
" " (Tyronne Division)†.	107	30	64,462	1,249	22.66		17.12	4.80	5.86	0.70		11.30			
" " (West Pennsylvania Div.)†.	104	26	54,553	2,098	33.17		23.47	7.80	4.00	0.50		12.10			
" " (Lewisston Division)†.	56	7	16,817	2,042	22.28		13.93	2.60	5.71	0.70		9.00			
" " (Bedford Division)†.	87	9	7,087	2,362	34.12		22.83	11.80	3.07	0.50		16.00			
Pitts., Ft. Wayne & Chi. (East'n Div.)*.	371	163	488,819	2,868	42.49		16.90	3.42	4.07	0.74	1.61	6.65 16.49	1.53	2.00	
" " (Western Div.)*.	280	130	329,973	2,750	33.00		16.75	16.00	1.16	0.12	4.54	6.24 25.65	2.63	2.00	
Pitts., Cin. & St. L. (Little Miami Div.)†.	197	99	99,119	2,432	38.47		12.82	4.66	5.31	0.74	1.51	6.29 21.37	1.00	0.80	
" " (Pitts. Cin. & St. L. Div.)†.	224	78	321,298	2,221	25.69		16.84	6.71	4.50	0.78		6.97 24.94			
Pittsburgh, Titusville & Buffalo*.	186		75,128		27.70		10.65	4.77	17.17	0.73		7.07 15.95			
St. Louis, I. M. & So. (Arkansas Div.)†.	325	32	83,490		26.00		15.00	6.97	6.24	0.68		7.07 15.95			
Stockton & Copperopolis.	49	3	4,033	1,344		62.53	17.85	3.39	8.00	0.73	0.78	8.99 21.69			
West Jersey†.	128	16	32,393	2,024	42.41	40.00	14.49	4.30	10.10	0.70		15.10	1.64	1.06	
Year ending Dec. 31:															
Pitts., Cin. & St. L. (P. C. & St. L. Div.)*.	224	104	2,901,929	29,760	29.40		15.42	7.44	4.14	0.80	2.10	6.76 21.24	1.13	3.04	

JUST PUBLISHED:

RAILWAY DISBURSEMENTS

And the Accounts into which they are Naturally Divided.

BY MARSHALL M. KIRKMAN.

Embracing carefully worded instructions in the form of concise rules for the government of the various officials and agents in reporting to the accounting officer; the material disbursed in operations; the labor performed by operatives; and the money expended on account of the company, and including copies of all the important blank forms required by employees in making the returns required of them. The rules have the great merit of simplicity, of directness and of comprehensiveness; they have the especially important merit of perfect practicability upon a road only a few miles in length, or one extending uninterruptedly across the continent.

The most carefully considered provision is made for arriving in the simplest manner possible at the cost of operating any particular section or division of a railway; railway managers will understand how important it is to a company that its disbursements should be methodically classified.

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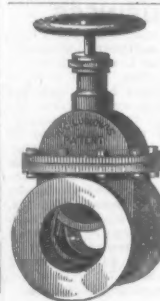
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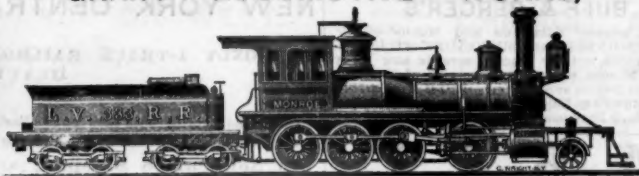
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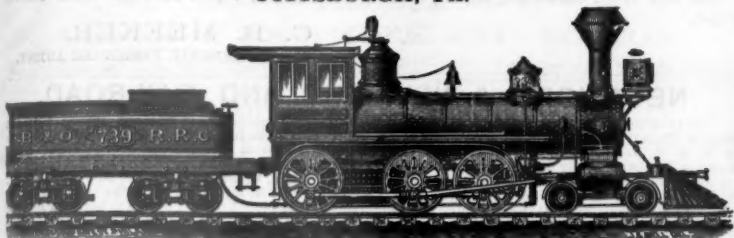


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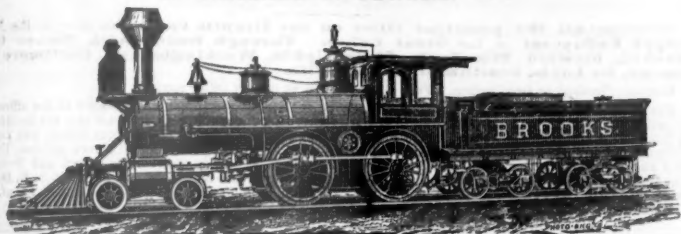
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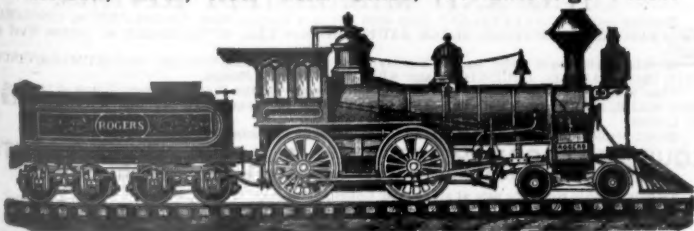
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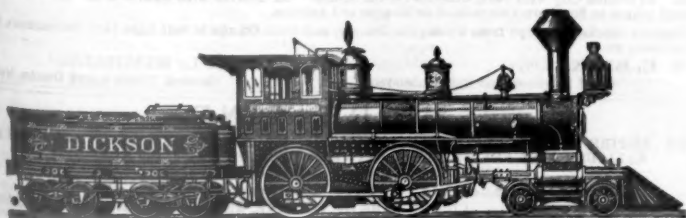
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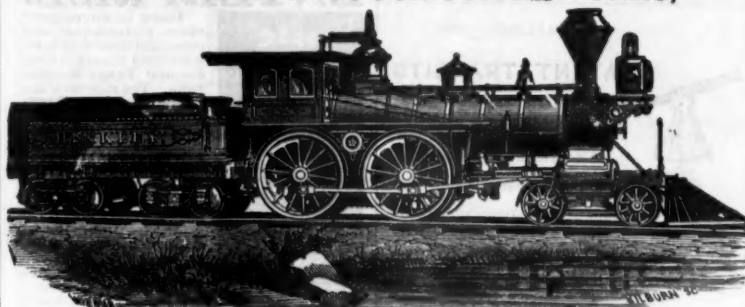
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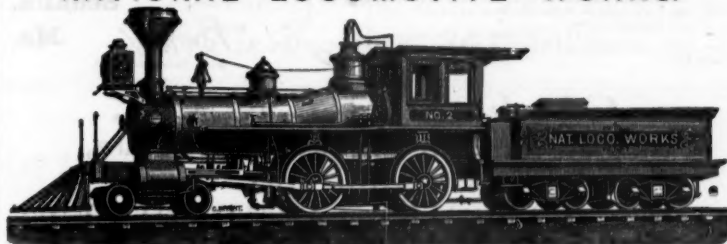
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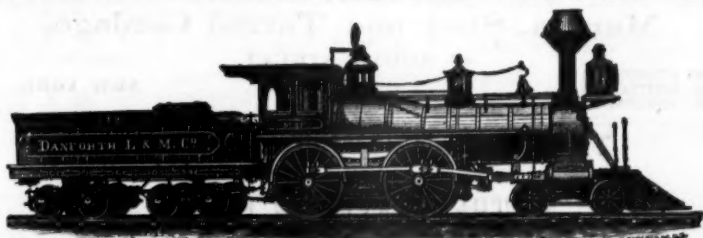
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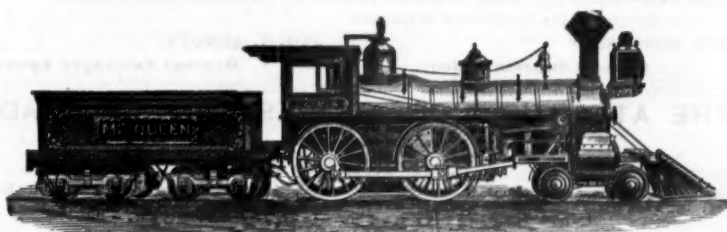
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During the Centennial Season—six months, closing November 10, 1876—the Erie Railway carried almost 3,000,000 passengers, without a single accident to life or limb, or the loss of a piece of baggage.

And for a whole year, the official records of the United States Post Office Department show the arrivals of Erie Railway trains in New York, on time, to be from 15 to 27 per cent. ahead of competing lines.

Facts well worthy the consideration of travelers.

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General Superintendent.

JNO. N. ABBOTT,

General Passenger Agent.

THE ATLANTIC & GREAT WESTERN RAILROAD,

In connection with the

ERIE RAILWAY.

form the Great Broad-Gauge Route to the WEST and SOUTH. For Chicago, Cleveland, Omaha and all points in the Northwest. For Cincinnati, Louisville, St. Louis, Kansas City and points in the Southwest.

THIS IS THE ONLY LINE, in connection with the Erie Railway, which runs through sleeping coaches from New York and local stations to Chicago, Cleveland, Mansfield, Gallon, Dayton and Cincinnati without change.

Special

The Southern system of railways are now running palace sleeping coaches from Cincinnati (in direct connection with express trains on this line) to Memphis, Jackson and New Orleans; from Cincinnati to Nashville, Decatur, Montgomery, Mobile and New Orleans—making but one change from New York to any prominent point South—via this line.

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ABRADOR (Sangler) WEDNESDAY, May 2, at 8:30 a. m.

PRICE OF PASSAGE IN GOLD (including wine): First cabin, \$110 to \$130, according to accommodation. Second cabin, \$72. Third cabin, \$40.

Return tickets at reduced rates.

Steerage, \$25, with superior accommodation, including wine, bedding and utensils, without extra charge.

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THE ONLY 4-TRACK RAILROAD IN THE WORLD, ALL LAID WITH HEAVY STEEL RAILS.

This is the favorite route between the East and West, sixty miles the shortest, and eight to twelve hours the quickest between Boston and New England and the West.

Wagner Palace Sleeping and Drawing Room Cars Attached to All Trains.

Through cars New York and Boston to Buffalo, Niagara Falls, Cleveland, Toledo, Detroit, Chicago, Indianapolis, Louisville and St. Louis, &c. No extra charge via Niagara Falls.

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Connecting all the principal cities on the Atlantic Coast with those in the Mississippi Valley and on the Great Lakes. Through trains with Palace Cars attached, between New York, Philadelphia, Washington and Baltimore and Chicago, St. Louis, Cincinnati and Louisville.

Baggage Checked to Destination. Fare always as low as by any other route.

For tickets, palace and parlor car accommodations, and all desired information, apply at the offices of the Company: Nos. 203 and 205 Washington st., Boston; No. 1 Astor House, Nos. 522 and 944 Broadway, and Dearbroses and Cortlandt street ferries, New York; Nos. 339 and 1349 Chestnut street, and Depot, Thirty-second and Market streets, Philadelphia; N. E. cor. Baltimore and Calvert streets, Union Depot and Northern Central Railway Depot Baltimore; N. E. corner Thirtieth street and Pennsylvania avenue, N. E. corner Sixth street and Pennsylvania avenue, and Baltimore and Potomac R. R. Depot, Washington City. L. P. FARMER, General Passenger Agent.

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FAST TIME, SURE CONNECTIONS, PARLOR AND SLEEPING CARS. Philadelphia Passenger Depot, Berks and American Streets.

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Morning trains leave daily except Sunday, with through Palace Coaches, for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE and ST. LOUIS without change. This is the only line making direct connection with all the Principal Trunk Lines of the East for NASHVILLE, MEMPHIS, NEW ORLEANS and all points in Texas, either by way of LOUISVILLE or ST. LOUIS.

Direct connection at ST. LOUIS for all Railway Towns in Kansas, Nebraska and Colorado.

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THE ONLY DIRECT ALL RAIL ROUTE; being 236 miles the Shortest Route.

Salt Lake, Sacramento, San Francisco, and the Mining Districts of Utah, Montana, Nevada, California, Etc., Etc.

Five Hours the Quickest Route to Denver.

Close connections made at Cheyenne with Denver Pacific Railway. At Denver with the Colorado Central. At Golden City with Daily Coaches for the Mines. At Denver with Denver & Rio Grande Railway for all points in Southern Colorado, New Mexico and Arizona.

Baggage checked through from Chicago to Denver, and from Omaha to Salt Lake City, Sacramento, San Francisco, etc.

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EMPIRE LINE.

THE EMPIRE TRANSPORTATION COMPANY OFFERS TO THE BUSINESS COMMUNITY A RELIABLE FAST FREIGHT LINE BETWEEN THE EAST AND THE WEST AND THE GREAT OIL REGION OF PENNSYLVANIA.

Via the Philadelphia & Erie Railroad and its Connections. IT OWNS AND CONTROLS ALL THE CARS OF ITS LINE, which are new and built expressly for its trade, and furnished with BROAD TREAD WHEELS, which enable it to run through irrespective of change of gauge, thus avoiding the injurious delays prevalent at transshipping points.

The Line is managed by men of long experience in the business, and no effort will be spared on their part to render satisfaction to its patrons.

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Leave New York from foot of Desbrosses and Cortlandt streets: 8:40 a. m. for Washington and the West, Richmond, Charleston and the South. Pullman Parlor cars from New York to Baltimore and Washington.

1 p. m. daily for Washington, the South and West. Pullman's sleepers from New York to Baltimore and Washington, making close connections for Chicago, Cincinnati, Louisville, St. Louis, Pittsburgh, the South and Southwest. Connect at Washington with trains for Lynchburg, Florida, New Orleans and the South. For through tickets please call at Company's offices, 315 and 1,338 Broadway, New York; and at the ticket offices, foot of Cortlandt and Desbrosses streets; and Depot, Jersey City.

ASK FOR TICKETS VIA BALTIMORE & OHIO RAILROAD.

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The Favorite Through Passenger Route

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The Short Line

To Quincy, St. Joseph, Kansas City, Denver, Santa Fe, and all points in Northern Missouri, Kansas, Colorado, and New Mexico.

The Direct Route

To Hannibal, Sedalia, Fort Scott, Denison, Houston, Galveston, and all points in Southwest Missouri, Indian Territory and Texas.

This is the only line between Chicago and Omaha running the celebrated Pullman Sixteen-wheel Dining Cars (used for no other purpose) and the Pullman Sixteen-wheel Drawing-Room Sleeping Cars. Secure tickets over this popular Route. Sold at all Railway Offices everywhere, North, South, East and West.

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This great corporation now owns and operates over two thousand miles of road radiating from Chicago like the fingers of a man's hand, its lines reach in all directions and cover about all of the country north, northwest and west of Chicago. With one branch it reaches Racine, Kenosha, Milwaukee and the country north thereof; with another line it pushes through Janesville, Watertown, Oshkosh, Fond du Lac, Green Bay, Escanaba to Negaunee and Marquette; with another line it passes through Madison, Elroy and for St. Paul and Minneapolis; branching westward from Elroy it runs to and through Winona, Owatonna, St. Peter, Mankato, New Ulm, and stops not until Lake Kampeska, Dakota, is reached; another line starts from Chicago and runs through Elgin and Rockford to Freeport, and via the Illinois Central, reaches Warren, Galena and Dubuque; and the country beyond. Still another line runs almost due westward, and passes through Dixon, Sterling, Fulton, Clinton (Iowa), Cedar Rapids, Marshalltown, Grand Junction, Missouri Valley Junction, to Council Bluffs and Omaha. This last-named line is the "Great Trans-Continental Route," and the pioneer overland line for Nebraska, Colorado, Utah, Idaho, Montana, Nevada, California and the Pacific Coast. It runs through the Garden of Illinois and Iowa and is the best, safest, shortest and quickest route for Omaha, Lincoln and other points in Nebraska, and for Cheyenne, Denver, Salt Lake City, Virginia City, Carson, Sacramento, San Francisco, and all other points west of the Missouri River.

On the arrival of the trains from East or South, the trains of the Chicago & Northwestern Railway leave CHICAGO as follows:

For Council Bluffs, Omaha and California—Two through trains daily, with Pullman Palace Drawing-Room and Sleeping Cars through to Council Bluffs.
For St. Paul and Minneapolis—Two through trains daily, with Pullman Palace Drawing Room Sleeping Cars attached, for St. Paul and through to Minneapolis.
For Green Bay and Lake Superior—Two trains daily, with Pullman Palace Cars attached.
For Milwaukee—Four through trains daily. Pullman Cars on night trains. Pullman parlor chair cars on day trains.
For La Crosse, Wis., Winona and points in Minnesota—One through train daily, with Pullman sleeping cars to Winona.
For Dubuque via Freeport—Two through trains daily, with Pullman Cars on night train.
For Dubuque and La Crosse via Clinton—Two through trains daily, with Pullman cars on night train to McGregor, Iowa.
For Sioux City and Wankton—Two trains daily. Pullman cars to Missouri Valley Junction.
For Lake Geneva—Four trains daily.
For Rochester, Sterling, Kenosha, Janesville and other points you can have from two to ten trains daily.

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Connecting with Trains on the Union Pacific Railroad for CHEYENNE, DENVER, CENTRAL CITY, COOK, SALT LAKE, WHITE PINE, HELENA, SACRAMENTO, SAN FRANCISCO, and Points in Upper and Lower California, and with Ocean Steamers at San Francisco, for all Ports to Japan, China, Japan, Sandwich Islands, Oregon and Alaska.

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OMAHA AND LEAVENWORTH EXPRESS (Sundays excepted)..... 10.15 A. M. 4.00 P. M.
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The Chicago, Rock Island and Pacific Railroad Company have now opened their South Western Division, between

LEAVENWORTH, ATCHISON AND CHICAGO.

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For all points in Western Missouri, Colorado and the Territories.

The Company have built a full complement of PALACE DRAWING ROOM AND SLEEPING CARS, with for exterior beauty and interior arrangements for the comfort, convenience and luxury of passenger, and are unequalled, if equaled, by any other cars of the kind in the world.

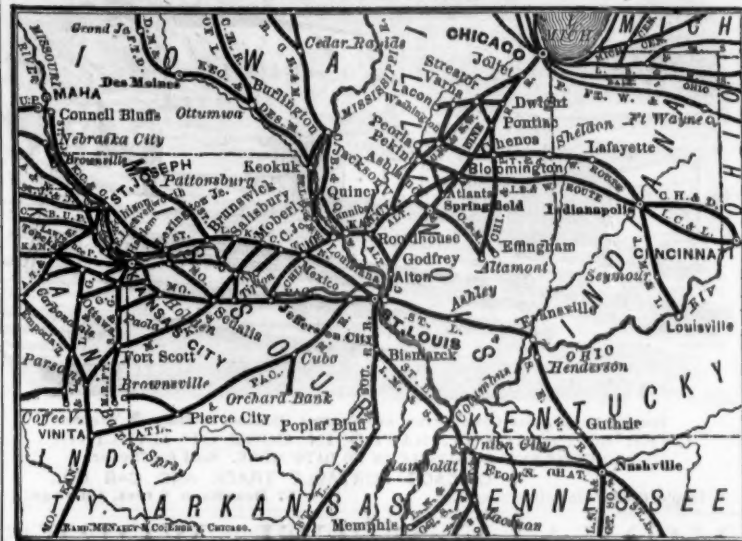
For Through Tickets and all desired information in regard to Rates, Routes, etc., apply to the Company's Offices, Chicago, or 357 Broadway, New York.

A. M. SMITH, Gen. Pass. Agent.

CHICAGO, ALTON & ST. LOUIS

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CHICAGO, KANSAS CITY & DENVER SHORT LINES.



The Best Line, via St. Louis, to Memphis, Mobile, New Orleans and all points South.

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No change of cars on any train by this line between Chicago and St. Louis. Pullman Palace Sleeping Cars—the newest, safest and best in use on any road—run through between Chicago and Springfield and Chicago and St. Louis without change. Meals in Dining Cars only 75 cents. No change of Reclining Chair Cars and Pullman Palace Sleeping Cars between Chicago and Kansas City. No extra charge for seats in Reclining Chair Cars. Two hours the quickest route from Chicago to KANSAS CITY, DENVER, PUEBLO and all points in Kansas and Colorado. No change of cars between Chicago and Peoria.

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Trains Leave Chicago from the Great Central Depot, foot of Lake Street. CHICAGO AND ST. LOUIS THROUGH LINE.

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8.30 P. M. NIGHT EXPRESS. Sundays excepted. Arriving at Gibson 12.30 A. M.; Farmer City 1.55 A. M.; Clinton, 2.35 A. M.; Springfield, 4.35 A. M.

DUBUQUE AND SIOUX CITY LINE.

9.30 A. M. DAY EXPRESS. Sundays Excepted. Arriving at Dubuque 7.00 P. M.; Waterloo, 12.05 A. M.; Fort Dodge, 5.35 A. M.; Sioux City, 12.33 P. M.

9.30 P. M. NIGHT EXPRESS. Sundays Excepted. Arriving at Dubuque 6.55 A. M.; Waterloo, 2.05 P. M.; Fort Dodge, 7.00 P. M.; Sioux City, 7.10 A. M.

This is the only Route to Dubuque and Sioux City without change. For Tickets, Sleeping Car Berths and information, apply at the Illinois Central Railroad Ticket Office 91 Randolph street, near Clark, and at the Central Depot, foot of Lake street.

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CARS RUN THROUGH WITHOUT CHANGE,

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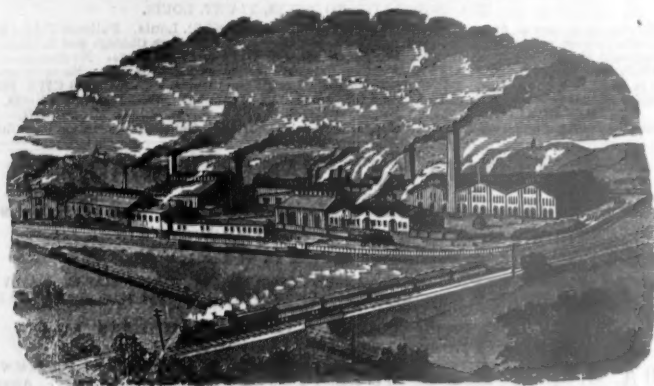
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These Sheds are
LIGHT, STRONG,

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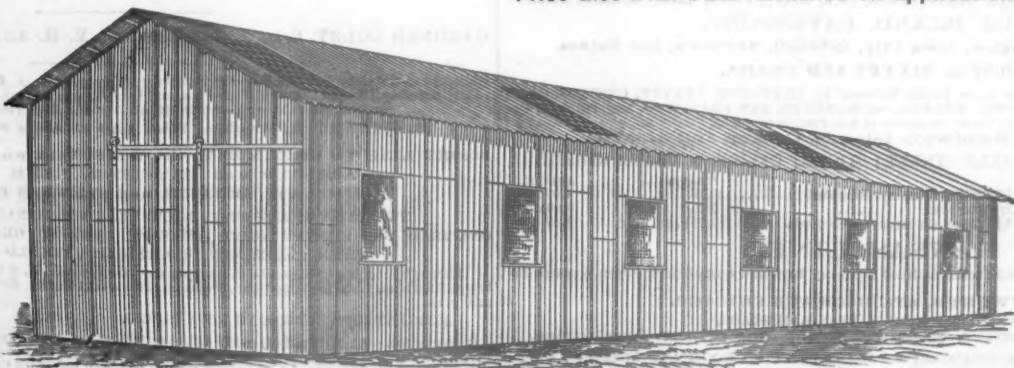
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They can be taken apart and
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These recent improvements in combina-
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